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A

PRACTICAL TREATISE

ON THE

DISEASES OF CHILDREN.

BY

JAMES STEWART, M.D., A.M.,
FELLOW OF THE COLLEGE OF PHYSICIANS AND SURGEONS, ONE OF THE CONSULTING
PHYSICIANS OF THE NORTHERN DISPENSARY OF THE CITY OF NEW YORK,
LATE PHYSICIAN TO THE ORPHAN ASYLUM, ETC., ETC.

Ex toto non sic pueri, ut viri, curari debent.
Celsus, De Medicinâ, Lib. iii., c. vii., § 1.

THIRD EDITION, CAREFULLY REVISED AND ENLARGED.

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PREFACE
TO THE SECOND EDITION.

A DEMAND for a new edition of a work is at once the most gratifying and the most unequivocal evidence that an author can desire, of the favorable reception of his production.

In complying with it, two important duties devolve upon him, if his work treat of any branch of science. The first is, that it keep pace with the progress and results of scientific investigations which may have occurred from the time of his previous publication: the second, that he avail himself of the remarks and suggestions of reviewers, and by duly considering them in a careful revision of the subject, ascertain whether in his judgment any essential improvement can be made in his treatise.

The author of the present work has not been unmindful of these obligations, on presenting a second edition to the profession. With respect to the first-mentioned, it has been his endeavor to record every important improvement in both theory and practice; and with reference to the second, the kindness of reviewers has left him but little to accomplish in the way of material alteration.

The addition of about thirty pages, will be a sufficient evidence that he has not been remiss in availing himself of every circumstance which in his estimation could enhance the value of the work.

NEW-YORK,
November, 1843.

PREFACE.

The rapid advancement of physical science, in the continually new application of its principles to the necessities of mankind, demands, from time to time, a review of the various subjects which it embraces, and a digest of the most prominent theories, and their practical deductions, which have been elicited by the laborious and enlightened investigations which characterize the present day.

In the department of medicine especially, the numerous treatises in its different branches bear evidence of the vast amount of interest felt in the investigations of the numerous facts existing throughout professional records, and in the occasional examination of prevailing doctrines.

That branch of medicine which embraces the consideration of children's diseases, has received a full share of the attention of the cultivators of medical sciences, both in Europe and America; and several works, abounding in practical experience on this subject, have issued from the press.

It can not, however, be denied, that a treatise, in which the whole subject of disease at the important period of childhood, is presented in a concise form, is now needed; especially as the actual condition of disordered parts, the result of morbid action, has of late received more than ordinary attention from the cultivators of pathological anatomy; a new era, it may be said, having commenced in the investigation of the diseases of man during the important period of growth. But it is unfortunate that many of the industrious cultivators of morbid anatomy have rarely applied their investigations to strictly practical purposes, which should be the object of all medical inquiry.

To attempt, therefore, the condensation of existing knowledge from facts, both from his own sources and from the recorded experience of others, and thus present, without the detail of cases, a treatise on the affections of children, in which the subject may be considered with a direct practical bearing, is the object of the author in the present essay.

In the required investigation, a great many works have been consulted, which it is unnecessary here to enumerate, as references have been made to them throughout these pages. That of Professor Schill on Pathological Semeiology, translated by Spillan, has afforded material assistance on the evidences of existing disease, but from the nature of the subject no reference has been made to this work.

For access to many of these works, the author is indebted to Dr. JOHN W. FRANCIS, whose extensive and valuable library, rich in some of the rarest treatises in professional literature and the kindred sciences, was freely placed at his disposal; and it affords him no little gratification to avail himself of the opportunity now presented, to express his sincere acknowledgments for this and many similar acts of friendship.

NEW-YORK, *April*, 1841.

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PRELIMINARY OBSERVATIONS.

In considering the diseases of children, that view of the subject which is the most natural, and consequently most in accordance with sound philosophy, is that which is in closest connexion with the successive development of the various functions; for upon the unimpaired discharge of the functions of every organ, the healthy condition of the system, especially in a growing state, absolutely depends. Besides this general consideration of the influence of growth in the successive operation of the assimilating process, and of the gradual development of the animal frame toward that state of perfection necessary for its ultimate adaptation to the sphere in which it was designed by its Creator to move, a more particular attention to the alteration occurring in the minute capillary circulation is necessary, at a period of life when growth forms the most prominent phenomenon.

In the organized frame during the period of increase, where the successive formation of parts is so signally controlled by the previous condition of the separate tissue, as well as of the entire body, this investigation into the molecular changes, constituting interstitial growth, becomes necessary, for the proper study both of the healthy and diseased state. This mutual dependance of the various functions of the human frame, and the chain of causes and effects as occurring at all periods of life, have long been the subjects of study: those arising solely from the development of parts during the period of infancy and childhood—the time allotted to the increase of the body—and the effects arising from their arrest or derangement, have received less attention from medical philosophers. That some cause must exist in addition to those to which adults are exposed, to predispose children to disease, and to produce the great mortality among them, is a self-evident truth. And this cause doubtless has its origin in the process of development, or in the necessary dependance of successive developments; as the occurrence of a suspension of the growth of a part must, without any other cause, be productive of disordered action, and thus be a source of disease. The excess of vitality, and the consequent redundancy of excitability, is a peculiar condition of the state of infancy and childhood, in close connexion with the development of the whole body, and a fruitful source of disease.

When the effects of growth are better understood—when the labors of the human and comparative physiologist—which have already opened to our view some of the hitherto deeply-hidden mysteries of our physical nature—shall be extended to the investigation of the principles which more immediately direct the development of unformed parts, may we not confidently anticipate the time when the nature of morbid affections in children will become better understood, and more under the control of the physician? The consideration of these subjects suggests an extensive field for cultivation, the magnitude of which increases with the contemplation of it in all its relations, and the difficulty of its proper study: it is a task for which the author is conscious that his abilities are totally inadequate; indeed it is one which, in the present state of science, it can scarcely be expected can be presented to the consideration of the physician, as a subject on which to found exclusive principles of practice for the treatment of disease. Although deeply impressed with the importance of this view of the additional causes of children's diseases, he will not, in the following pages, attempt to apply them to the various affections to which children are subject; but will be contented with suggesting, in the systematic arrangement, the broad principle of the successive development of the functions, as the boundaries and landmarks of their morbid affections, and the process of increased capillary circulation attendant on growth, as the chief predisposing cause of the frequency of disease among them.

The division of the subject adopted in this work, is that founded on the functions of the human frame, as the most natural; and the one which is most practically applicable is that proposed by Galen, and which, until the time of Bichat, was the division generally adopted. Bichat arranged the functions into those which relate to the preservation of the individual, and those which relate to the preservation of the species. The former were again subdivided into several minor divisions. Such an arrangement of the functions is inapplicable to the subject here undertaken; but that proposed in former days is here adopted—a division which is in fact the foundation of the various suggestions of physiologists made in later times. The diseases of children have therefore been arranged under the three divisions of the functions of the human body, which are the most natural in the order of their development, and which, on this account, may become the sources of disease. 1. The vital functions, or those which are essential to life, and without which animals can not exist; as the circulation and respiration. 2. The natural functions, those which are instrumental in repairing the several losses which the body sustains; as digestion, chylification, and secretion, which may be suspended for a time without destruction of life. 3. The animal functions; those by the agency of which we hold communication with the surrounding world; as the motor and nervous systems.

Such is the arrangement proposed; and with this system the whole subject can be properly brought under consideration, in the order presented to us by the successive appearances and development of the great functions of the human body; commencing with the first in the natural order, that of the simple organic function of circulation, and terminating with the last in the succession, which gives the young being his place in the scale of animals and created intelligences.

In considering the various subjects treated of in this work, those phenomena which depend on the derangement of vitality, so liable to occur when this abounds—on the manifestation of disease during life—the disorder of function, and the mutual dependance of the different organs, will be regarded as of importance in considering the pathology and treatment of disease; and as in many cases preceding the sanguineous congestion or disorganization of the solid portions of the body revealed on dissection. How important soever the ultimate effects of deranged action, the destruction of a part exhibited on autopsical examination may be—and none can be more sensible of its importance than the author—it is evident that too much reliance has in some instances been placed on these revelations as the only guide for us in practice, without duly considering that they ought rather to be regarded as the effect of previous diseased action. Disorganization of structure is the evidence of the loss of vitality in the affected part; it is the consequence, not the essence of the disease: we should not therefore regard this condition as in every instance giving all the information we need, and as our sole guide in the treatment, but only as a mark of what has pre-existed, and which alone we are to consider as the disease. Anatomical investigations are of great value in detecting the changes which occur from diseased actions in the various tissues—to determine the nature of these alterations and their relations to the symptoms—but are of little use in ascertaining the nature of disease producing these alterations.

An exclusive attention to the solids, when investigating disease, and the almost entire predominance given to organic changes, by some cultivators of pathological anatomy, have caused the alterations which occur in the fluids—constituting five sixths of the body of an adult, and in children a predominance beyond estimation, while in the early embryo almost its whole substance—to be left altogether out of view; and although the pathology of the humors may have been in former times carried to an absurd extent, yet it is equally absurd in the present day to pass to the other extreme, and to deny the existence of changes in this portion of the materials of the body, when it is considered that the solids themselves are dependant on the proper proportion of the constituents of the blood for their healthy condition. It might easily be supposed that the complicated nature of this fluid would readily expose it to alterations, and that morbid changes would occur in a rare as in a dense part of the structure; for the simple consistency of the part can have but little influence on its liability to alteration, except that the harder and more permanent parts of the body would be the least exposed to these alterations. It may not be out of place to refer briefly to a few well-known changes, as the facts they prove have some bearing on the subject under discussion.

The blood may be deficient in some of its component parts, or may possess an excess of one or more of its elements; as the fibrine, albumen, hæmatosine, or the saline ingredients. The spontaneous separation of the cruror and serum shows at times a difference in its process; the former being firmly coagulated and cupped, and the latter in appearance excessive in quantity. Again, the opposite condition exists, the coagulum less dense, while the serous part is apparently small in quantity. In other instances it exhibits the albumen on the surface of the coagulated mass, which, in connexion with the fibrine, forms the buffy coat. Various other changes may occur, as has been proved by experiments on the lower animals by Gendrin, Dupuytren, Noger, Dupuy, Cruveilhier, Magendie, Andral, and others.

Its dissolved condition was long since observed by Sydenham and Huxham,* and more recently by Dr. Stevens.† With regard to the important influence of its coagulability, the experiments of Magendie, contained in his recently published lectures on the blood, give very striking illustrations;‡ having demonstrated that this property is an indispensable condition to the free and regular continuance of its movements in the capillary system. Of what inconceivable importance, then, must it be to the growing child, and what a source of disease, where all depends on the proper proportion of its ingredients! Chemical tests will also detect the occasional alterations of the blood; that drawn from a variolous patient is acid, as is shown by placing a piece of litmus paper in the serum, according to the experiments of Magendie, in the work just mentioned:‖ other chymical changes are also given by him. Many diseases which have been considered as new tissues, as medullary sarcoma, melanosis, etc., ought to be regarded, according to the views of Andral, as the effect of altered secretion; for every degeneration of a part, on considering the process of its formation, is but an alteration of the circulatory and secretory process.

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* On Epidemics, vol. II., p. 68, et seq.

† Observations on the Blood, read at the College of Physicians and Surgeons, May 3d, 1830.

‡ Lectures on the blood and its Changes.—Philadelphia edit., p. 12.

‖ Page 20.

It is evident, then, that both solids and fluids are affected in diseased action, and the cause must be sought in that peculiar property of organized structures denominated vitality, existing in all parts, on which the growth and maintenance of the body depend. If the healthy increase, and the property of resisting the tendency of all such bodies to decomposition, either in whole or in part, are to be referred to this power, any disturbance of it must be attended with a derangement of the functions of the part, and if continued, with an alteration of structure. So long as the vital property is in normal exercise, so long will the system continue in the healthy discharge of the functions of digestion, nutrition, circulation, etc., the relative actions of deposition and absorption will be maintained, and the health of the individual effectually preserved. As this property is in exercise in all the body, and in every separate portion of it, both solid and fluid, in a manner which may be regarded as in a degree independent, so any particular abnormal alteration of its action must be attended with a corresponding change in the part experiencing these alterations. This will appear more evident when the ordinary manifestations of vitality are considered, and which it is necessary to examine, that the views here suggested as to the commencement and progress of diseased actions, and the important agency of the development of the body in their production, may be the better understood.

The idea of life most in accordance with the present advanced state of physiology, the result of continued investigation, and the illustrations which have been afforded by comparative physiology, is not that of an imaginary principle presiding over the whole system, directing and controlling its operations—an idea which was formerly adopted to explain what had eluded the closest researches, by referring the phenomena exhibited by a living body to a separate agent or power—but as one of the essential properties of organization manifested in an assemblage of phenomena, which distinguish the two great classes of the organic kingdom, vegetables and animals, to which alone these phenomena appertain. All organized matter possesses, in its very constitution, certain properties so peculiar in their nature, that upon the application of certain stimuli, those phenomena are produced which are known as vital actions, the effect of properties not superadded after the formation of the organized mass, as formerly understood—an elementary substance controlling the body—but, as is most natural to believe, and the most agreeable to the uniform simplicity observed in works of the Creator, imparted on the original formation of the classes as a part of their constitution: each class manifesting its own peculiar series of phenomena, by which it is distinguished from the other, and both thereby widely separated from the inorganic kingdom; while the analogous action of each tissue in both classes is sufficient to prove the identity of this principle or property of organization.

It has been supposed to be a peculiar principle of action, an aura or gas, an abstract power presiding over the body, and known by the names of vital principle, anima, archæus, etc., by Aristotle, Van Helmont, Stahl, and others, even of quite recent times, among whom is the physiologist Müller.* From this it would appear that a controlling anima was supposed to exist in vegetables as well as in animals; but whatever be the precise nature of the cause, all observation would lead us to the conclusion, that it is not thus that the phenomena of vitality seen in plants are to be explained, but that they arise from an inherent property, common to the whole organic kingdom, distinct from the addition of the nervous system in animals, and from that principle superadded in men, which, while it adds perfection to his organic system, by placing him in the highest part of the scale of animated nature, is, at the same time, the connecting link between him and the incorporeal intelligences of the spiritual world, the perfection of that remarkable gradation which the observing naturalist has traced as pervading the two divisions of the vital kingdom.

Of the precise nature of the cause of the phenomena of life, it is impossible for us at any time to have any clear comprehension; but some knowledge of its general manifestation, and consequently, the nature of its connexion with an organized structure, will be obtained by considering the analogy observable throughout the vegetable and animal world.

Under different modifications, vitality exhibits its phenomena in every organ in the vegetable and animal structure; in both, the great agent of nutrition, and in the latter, that also of the functions of relation, by which this class is adapted to the surrounding world in a manner different from the other class, and thus from the assemblage of its manifestations in some sense independent, presents to us at once the general principles from which we may infer that it is the inherent property of the organization.

In the propagation of plants and animals, there is an analogy in the process of generation. In both, the first manifestation of vital action is in the germe—a fluid possessing the power of spontaneous life—and the action is that of simple development. As the different parts are successively formed, vitality exhibits itself by phenomena peculiar to the different parts formed. Circulation, deposition, absorption, contractility, follow each other in both classes, both growing by nourishment absorbed from analogous parts—the plant from the albumen of the cotyledon of the seed; the fœtal chick from the vitellus or albumen of the egg. The growth of the fœtus bears a close resemblance to the entire vegetable life, from its attachment and dependance on a source exterior to its own body for its entire support, and may in one sense be termed a zoophyte. The young animal, unlike his after mode of existence, obtains his nourishment by absorption, or transmission of the appropriate stimuli for development and support. Plants may be produced by offsets or cuttings; in the lower animals, zoophytes and polypes, propagation is effected in the same manner. Growth and nourishment are here produced by the inherent vitality of the separated slip or portion of the plant or animal, entirely distinct from any supposed centre of vitality which exists in the germe or matured structure; the principle of development being excited into activity by the influence of heat, moisture, and perhaps other causes, of which, in our present state of knowledge, we have but a very imperfect idea.

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* Elements of Physiology, by J. Müller, M. D. Translated by Baly, Lond. 1837, p. 28.

Plants, like animals, possess a circulating system; arteries and veins, sap vessels or lacteals, and lymphatics. The arteries arise from the root, and convey nourishment upward; next to these are the veins, which return the elaborated sap from the leaves to the new layer of the liber.* The sap vessels, corresponding to the lacteals in animals, convey the nourishment to the body of the plant as the chylous vessels do from the intestines of the animal. The lymphatics of the plant are found immediately beneath the cuticle, and from the direction of the valves appear to be intended to pass the fluid in the same direction as the veins. Plants, then, have a double circulation; the arteries and lacteals to convey the sap upward, the veins and lymphatics to pass it in the opposite direction.† Plants also possess, equally with animals, vessels for cutaneous transpirations. Some of them, as the sunflower, Helianthus *annuus*, give out an enormous quantity of perspirable fluid compared with their bulk.

A compound fluid exists in vegetables, corresponding to the blood in animals; and as the secretion of substances possessing various qualities, from that of a simple article of nourishment to one highly destructive to animal life, occurs in the same plant, so does the blood separate in animals, as in some of the reptile tribe, secretions for nourishment, and a poisonous juice, destructive to the life of animals, for defence.

Respiration is a process which is continually taking place in plants as well as in animals: and, in the fungi, almost as actively as in animals.

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* Smith's Introduction to Botany, p. 56, et seq.

† Wildenow's Introduction, p. 236.

Contractility, on the application of stimuli, is another analogous function existing between vegetables and animals, in neither continuing longer than the existence of vitality. The examples of this contractile irritability in vegetables, corresponding to the irritability of the muscular fibre, are very numerous, and in some instances so allied to sensibility and consciousness, and consequently to the appearance of voluntary power, as to have given rise to the fanciful idea of the existence of a brain and the corresponding passions.

Vegetables, in some instances, like some of the insect and reptile tribe, annually exfoliate their cuticle, and thus give another instance of the analogy of vital action, which, in both classes, thus entirely leaves a portion of the body destitute of this sustaining property of organization.

Both plants and animals sustain themselves uninjured under great changes of temperature; and both classes, from the existence of innate warmth, have been known to affect the thermometer. Deciduous plants resist the severity of the winter's cold, and bear removal without being injured. So also, eels, newts, and leeches, have been frozen in ice, torpid, and to appearance dead, and upon thawing the ice were restored. The first-mentioned animals have been conveyed thousands of miles in Russia, and been completely revived after carefully thawing them. Plants have also been found to resist extremes of heat. Flowers flourish in the neighborhood of volcanoes, where the thermometer stands at 210°; and confervæ grow in springs, at a temperature of 212°. Fishes, also, have been seen swimming in water at 158°, while men have often been exposed uninjured to a heat of 264°, and for short periods even higher than 300°.

Both animals and vegetables afford instances of their amphibious nature; the tortoise, eel, etc., among the former, the rush, rice plant, and algæ, among the latter.

Animation may be suspended in both, often for a surprising length of time, while the animating property continues to preserve the organic frame. This is seen not only in seeds and eggs, but also in the matured structure. The torpidity or hybernation in most vegetables and some animals, shows this suspension from the same cause, and its restoration in both with the return of spring. Mosses and animalculæ have been deprived of all appearance of life, on being dried, and kept apparently dead as specimens in cabinets of natural history for years, and then moistened into life and activity.

It would be extending these remarks to an unreasonable length, were we to enter into a detail of all the analogies existing in these two classes; the classical work of Good on the Study of Nature, and the more elaborate and scientific production of Carpenter, may be consulted for further information on this subject.*

What are the natural inferences from the analogy thus found, to exist throughout the two classes of organized matter?—An analogy in some instances so close, as to amount to identity of action, rendering it difficult to know whether to consider some genera of plants as animals, partaking, as they do, so much the nature of both, as to have received a name indicating their mutual identity. It is clear that the property which causes the phenomena of life is the same in both, and an inherent part of the organization for developing the structure, and sustaining it against its natural tendency to decomposition—a distinguishing mark of one of the great kingdoms of nature; and that a derangement of this essential property, either directly or indirectly induced, must produce disease.

As it appears that vitality is no special controlling agent, a distinct power or essence apart from organization, but a law of its nature, or that plan for its continued action which the Creator has originally given to it, and which is essential to its existence, so it might be expected that vitality would be found as an inherent property in every tissue, organ, and fluid, constituting the organized structure.

That vitality is inherent in the tissues, or in a set of organs, appears from various experiments that have been made on animals, and particularly on the muscular fibre, proving it to be independent of the peculiar action of any other part; and it is also proved by the analogous action in vegetables.

In animals, until the time of Haller, the nervous system was believed to regulate all the functions of the body, including, of course, the contractile power of the muscles, the actions of which were divided into voluntary and involuntary, a distinction long since made by Willis, Boerhave, and others; the first-mentioned class taking their power from the cerebellum, while the latter were referred to the cerebellum.

× Cerebrum

The experiments of Haller led him to the belief that there existed in the muscles a property independent of the nervous power, the vis insita or contractility, by which it yielded to the influence of appropriate stimuli: the involuntary muscles to the stimuli of the blood, alimentary substances, etc., and the voluntary muscles to the stimulus of the nervous power, the exciting or suspending of which was the source of action or rest in these muscles. The existence of a power independent of the cerebro-spinal system has been repeatedly proved by the experiments of dividing the nerves going to the muscles, and then stimulating them to contraction; this contraction has also taken place after the limb has been removed from the body.

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*Principles of General and Comparative Physiology, by William B. Carpenter, London, 1839.

In recent experiments, Dr. Philip* has proved that the muscular action of the heart, and vessels which carry on the circulation, even in the remotest parts, arise from an inherent power independent of the nervous system, and that the circulation in the capillaries is itself independent. In the muscles of voluntary power, the nervous influence, so far from bestowing excitability, exhausts it, like other stimulants. The muscular power of the stomach and intestines, also, like that of the heart and blood-vessels, resides in themselves; and they consequently act from their own power, when deprived of the nervous influence. The vessels of secretion, also, have no necessary dependance on the nervous system; and although the nervous power occasionally influences them, yet these, as well as those of circulation, possess an intrinsic vitality, manifested by their own peculiar phenomena.

These facts have a very remarkable analogy exhibited in the contractility of the fibrous tissue in vegetables; a texture which Vauquelin has proved does not exist exclusively in animals, having been also discovered in plants, where no organs for the transmission of nervous power have ever been found. This contractile power is very great in several plants; the Venus fly-trap, Dionœa *muscipula*, the sensitive plant, Mimosa *sensitiva*, and other highly irritable vegetables, furnish remarkable instances, independent of anything like nervous power; for galvanism has been applied in vain to excite contraction of the vegetable fibre in these plants. The brain and nervous system in animals are manifestly organs of relation, connecting them more perfectly with the surrounding world, and in the body being a medium of union between the various parts of the system, by which the mutual dependance of parts is made more subservient to the perfection of organization: they are not therefore to be regarded as the source of vitality, but simply as possessing a vitality of their own, with their own mode of its manifestation.

If vitality be a property of organization, it must exist in every part of the organized body, in the fluids as well as the solids; and experiments prove its existence also in the fluids. The celebrated physiologist, John Hunter, has proved in a number of instances the life of the blood; making it analogous to the muscles, in possessing the property of contractility on the application of stimuli; this contractility or coagulability is greatly increased where vital action is much exalted, as in fever and inflammatory diseases. It retains also an equality of temperature in every degree of atmospheric cold, while circulating in the body; and even in the state of the germe or ovum, as is seen in the young chick, it resists for a long time a great degree of cold and heat, and the process of decomposition.

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* An Experimental Inquiry into the Laws of the Vital Functions, by A. P. W. Philip, M. D.; London, 1839, pp. 43, 99, 103.

The blood, in limbs that have become paralytic, has the power of preserving life when the vital energy has departed from every part. It can, also, by its own inherent power, produce new vessels of every description from its own substance. The blood, also, like the muscular fibre, may by a stroke of lightning be in an instant deprived of its vital properties, and, like the effect of the same agent on muscle, it may be left uncoagulated and uncontracted.

Vital actions have been regarded by some, who have repudiated the idea of a controlling power or principle, as nothing more than certain movements of either particles or masses of matter, closely analogous to those in unorganized matter, denominated chymical or mechanical, and which are justly ascribed to the powers resident in these matters causing the phenomena of attraction and repulsion; similar powers and properties in organized structures being competent, while they are in mutual cooperation, to effect those actions in which life consists, and which of course terminate on the cessation of this co-operation, as the ingredients of a chymical compound cease to be agitated when their affinities are satisfied.*

Such a view of it goes further than the present state of science will warrant; and all we at present know of it is, that this remarkable property, so essential to organization, can only be known by its effects. We have seen that its manifestations and results are exhibited with close analogy in vegetables and animals; that upon its normal exercise depend growth, nourishment, and preservation; and that the organization itself extends and multiplies vitality, so that both life and organization are mutually dependant, the one of necessity existing with the other. A more perfect knowledge of its nature, in all probability, we will never possess; and indeed, in the present state of science, there is nothing more known of physical phenomena than their effects, which, from the similarity of their manifestations, their freedom from complication, the definite ideas we form of them from the simplicity of one physical property in many cases, make us contented with observing them in their results, and being satisfied with this amount of our knowledge in reference to them: those which are the product of vital action, being much more multiplied, from the great variety of the organs which exhibit them, so complicated from their connexion with other parts, especially in animals, and, on these accounts, affording us less definite notions, as the results of one power, we naturally feel less satisfied with the knowledge we have of them.

As the proper exercise of vitality is necessary to health, so any derangement of it must be productive of disease; therefore it is not to be expected that structural alteration must in all cases precede disordered function, as has been asserted by some; a condition disproved by daily experience, all the phenomena of disease being often, except in the case of physical injury, nothing more, at the commencement, than the evidences of deranged action.

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* Rudiments of Physiology, by John Fletcher, M. D.; Edinburgh, 1837. Part V., p. 26.

That vitality may at once be affected independently of any previous disorder of the organization, appears from a stroke of lightning, or from the effects of prussic acid. It is also well known that an attack of congestive scarlet fever will cause a great loss of vital energy, depriving the heart and blood-vessels of their power to carry on the circulation, the patient steadily and rapidly parting with vitality, and quickly dying, without the slightest evidence of reaction. These are extreme cases, but are on that account remarkably illustrative of the derangement of vitality being a cause of disease and death. The spontaneous gangrene of a limb, which is its total death, is an instance of the effect of the loss of vital energy in a distinct and separate portion of the body, showing, that as the vitality of the part is in the part itself, so, from a cause for which we can not assign a reason, the cessation of this action will necessarily arrest the process of absorption and secretion, and terminate the sustenance of the part, abandoning it to the operation of those chymical changes to which all animal substances naturally tend, when not under the control of vitality.

It is not from this cause alone that diseases may arise; they may be produced by derangement of structure, as the primary movement affecting the life of the part, as is natural to suppose would be the case when the sustaining power is a property of organization. Contusions, wounds, or fractures, are the most prominent instances of derangement of function from molecular disturbance: the vitality of the part being thus affected, becomes in its turn a cause of irregular action, thus materially affecting the natural progress of nutrition, and the organization experiencing, and, when sufficiently continued, exhibiting, the effects of this morbid influence.

Vitality and organization being therefore dependant on each other, whatever deranges the one must necessarily affect the other; each in its turn becoming successively the cause of disease, manifested by various phenomena exhibited according to the different organs or tissues affected, and the stage of the disease. Inflammatory action, structural alterations, all disordered action of whatever nature, must be referred in the commencement to the altered action of the inherent property referred to, produced either by a cause affecting it directly or indirectly through the structure.

If it be impossible for us to explain in what manner it exists, or what is the nature of its departure from the normal action in the production of disease, or to direct appropriate remedies for the prompt removal of the deranged action, we have no greater amount of ignorance in relation to this subject, than of the nature of magnetism, and of the variation of the magnetic meridian, or of the means of correcting the deviation; and in the remedies for both aberrations, the analogy still exists, our efforts being rather to counteract by suitable means the effect of these changes, than to attempt to alter their real cause. This law applies to every department of natural science.

The tissues or anatomical elements of the organs may be individually diseased, possessing as they do the property of vitality in themselves. The dermoid, osseous, exhalent, absorbent, cellular, and mucous tissues, are those apparently more often diseased than others. The skin, from its complicated structure, and from the facility of observing its changes, affords a familiar illustration of the independent affections to which a tissue is subject. In erythematic inflammation of slight character, the reticulated vascular tissue is the morbidly affected part, and the only symptoms is a slight itching, and as an ultimate effect, the separation of the cuticle in small scales. The sub-cutaneous cellular tissue may also become the seat of inflammation, producing tumefaction, exhalation of serum, or secretion of pus. The various forms of eruptive or exanthematous affections have their seat either in layers of the skin, or in the sebaceous and mucous follicles. Whatever be the forms of the disease, they are the effects of a deranged, and generally an exaltation of the organic action of the part, and may occur independently of the action of any other tissue.

From the intimate association of one organ and its functions with others, and from the harmony existing throughout the whole frame, a part of the animal system, however small it may be, can rarely be disordered, without producing a deranged action in other parts; no modification can occur without involving in its changes other organs and disordering their functions. These effects may arise from simple mechanical obstruction or contiguous sympathy, from the necessary dependance of the whole system on the proper exercise of the functions of the organs, and from the general sympathy exercised by the organs on each other through the medium of the nervous system. This connexion is more perfect in proportion to the high grade occupied by the animal; in man, therefore, it exists in the highest state of perfection, and arises from the necessity of the actions of the functions to preserve life; and when all the organs throughout the system act in harmony, a healthy activity is the result.

It is obvious, therefore, from this mutual dependance, that when a disordered action occurs in one part, others will participate to a greater or less degree in the derangement, whether it be of function or organization; and when either are affected, the other will participate in the derangement. Respiration gives an instance of the influence of a function on the organization; for if it be from any cause interrupted or suspended, and the venous blood be no longer changed by the oxygen of the air, every part instantly feels the effect, and of necessity dies; the brain, spinal marrow, and heart, all have their functions arrested, and circulation and consequently nutrition cease, from the defect of the supply of oxygenated blood to the tissues. Upon the integrity also of the digestive function depends the healthy formation of the sanguineous fluid, and consequently the process of the interstitial nutrition, and the proper action of the organization: disease must therefore ensue where so important a function is deranged. When the organization is affected, also, as in the case of injury to the respiratory muscles, or to the portion of nervous system supplying them with the nervous influence, respiration is necessarily affected.

The connexion of parts from sympathy may be illustrated in irritation of the mucous membrane of the stomach and bowels; from undigested or acid ingesta, exciting a similar action, or even one of greater severity, in the brain; convulsions in children not unfrequently arising from this cause, without the existence of any morbid state of the structure; all the symptoms being speedily removed upon the evacuation of the irritating cause. It is also worthy of remark, that sympathy exists in a greater degree where vitality is in the greatest exercise; children consequently manifest it in a very marked manner, and in acute diseases, it is also more perfectly developed than in health.

From this sketch, vitality is evidently a property peculiar to the organized structure, and as such, its actions are traceable through all living things, from the lowest cryptogamic plant to the highest part of the scale of animal life, as an independent property of the anatomical elements, possessing throughout an identity which proves it to belong to the remote part of organization where nutrition occurs, and on which the growth and preservation of the body depend. Its manifestations by different phenomena in the different organs and fluids, from which the solids are formed, are presumptive evidences of its inherent, independent nature in each tissue, corroborated by the analogy of the lower animals and vegetables, where separate portions possess the power of separate existence as distinct individuals. The healthy action of each part and of all parts, therefore, depends altogether on the integrity of this property; for without its agency all parts must suffer, and disease and disorganization be the result; being essential to health, wherever it is in any degree affected, disease of greater or less severity must follow.

In the adult, the whole operations of vitality may be comprised in the preserving and recuperative processes; to them are added, in the infant and child, the more active process of development, with all the train of consequences upon its disturbance in any one part or tissue. In the child everything predominates that is connected with organic growth, and of necessity with a redundance of vitality; and on which alone the growth of the body depends. The desire for food is frequent, the digestion rapid, the blood and all the fluids are in great excess; capillary action, secretion, deposition, and interstitial increase, proceed with great vigor, while the nervous sensibility is in the highest activity. In all parts of the body, therefore, when growing, vitality is in the most powerful exercise; and, from all the phenomena attendant on growth, the latter differs from inflammatory action only in degree, a condition which may speedily be induced upon any disturbance of the developing process. In the various ways in which vital action may be deranged, whether it be by being suddenly attacked independently of the organization to which it belongs, or secondarily through a disturbance of the minute tissue of the structure, how important does it appear to the growing child, and how fraught with danger to its existence, where this property of the structure is interrupted in its energetic action.

It has been remarked that infants grow more during the first year, the increase becoming less rapid as the child approaches the fourth or fifth year; and it is well known that during the first-mentioned period, violent disease and sudden mortality more frequently occur than at any other time of life. Here, then, is a direct relation subsisting between the rapid increase of the body, and its tendency to severe, sudden, and fatal disease: the naturally exalted action of the capillaries in developing a part being easily made to pass the boundaries of the healthy process of growth, and become the active agents of inflammation. The obstruction also of one part, and the continued development of another, may give a preponderance to an organ or set of organs, which, although not so violent and fatal as the instance just cited, may yet impart a peculiarity to the body materially affecting the health through after days.

The symptoms accompanying the process of dentition are a familiar illustration of the influence of the development of a part in producing diseased action. Although a natural and healthy process, yet it is almost always accompanied with an increased flow of blood to the gums and salivary glands, the former becomes swelled, and the latter are excited to increased activity. In the greatest number of instances, stomatitis to a greater or less degree occurs, and the mouth appears hot and dry, and febrile disturbance not unfrequently attends this process; and these derangements are remarkable in proportion to the number of teeth growing at once. Another instance of the effect of development of parts is the disproportion between the rapidity of the eruption of the teeth and the growth of the jaw: the tardy development of the latter uniformly occasioning inflammation. The connexion between teething and disease is one of great importance in the treatment of children during that period; for whatever morbid phenomena may arise, this process invariably adds to the existing excitement, from the great susceptibility of the system at this time. Acute diseases, or simple nervous disturbance, may often be speedily alleviated by removing the irritation of the gums; and a knowledge of the fact of the great derangement produced by the irritation of the protruding teeth, has long enabled the physician to bring a most powerful remedial means to the relief of children suffering from disease during the development of the teeth.

The influence of growth has also been remarked in the effect of the pits left in early life after small-pox, whereby the excretory ducts of the skin, of which there are many millions, are obliterated. At the early period of life a serious change occurs in some of the most important functions of the animal economy; for the integrity of the circulation on the surface of the body, which is a very essential process in early life, is materially affected. To this have been referred the diseases of the glands, eyes, eyelids, bones, and other organs, which have been observed to follow small-pox, and to continue, with remarkable obstinacy, until age has in some respect restored the circulation to its proper balance.*

Another illustration of the effect of the development of parts in the production of disease, is that afforded by the muciparous follicles of the intestines. Before the period of dentition they are scarcely to be discerned, even on the closest inspection. When in the order of the natural unfolding of the various parts of the infant's frame, those parts which are about to be fitted to the reception of a new kind of food are undergoing the necessary changes, these follicles for the first time show themselves in a state of activity, pouring forth an abundance of their peculiar secretion. Thus far their action is a natural one, and one of health. Should it become excessive, a serous diarrhœa is the consequence, demanding the interference of the physician for its removal. This same condition of development of the follicles, when complicated with other derangements of the system, and kept in a state of morbid activity by the continual operation of certain exciting causes, terminates by producing one of the most fatal diseases of our climate, the cholera of infants.

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* T. Chevalier, London Medical and Physical Journal, August, 1828.

The development of the brain also gives another instance of the deranged vital action, at a time when this action is in the greatest excess, causing disease. It is well known that this organ, although large in size, is very imperfect at the time of birth, consisting merely of a mass almost fluid. It is not complete in its parts until a year or more has elapsed, during which period the vital energy of the part is in great activity, carrying on the process of development. Is it therefore a matter of surprise that infants are so often attacked with convulsions, on the application of any cause which will in any way disorder the all-important action of building up the great source of supply of the stimulus to the muscles ?—irregular and involuntary contraction taking the place of the ordinary effect of a healthy condition of the brain, and the regular transmission of nervous power.

Besides these particular evidences of the effects of development, there are others in which an excess of action in one set of organs gives a preponderance of one system over another, and imparts to the child a peculiarity which predisposes it to a certain class of diseases. Thus, where the circulating system is active and vigorous, everything shows great strength, the body receiving a full supply of blood; nutrition proceeds with great activity, and a strong tendency to inflammatory diseases exists, where this development, or sanguine temperament, occurs.

Other children are seen with a sluggish circulation, little activity of the muscular system, and presenting the appearance of greater development and preponderance of the lymphatic system; and congestions of these organs, and obstructions of the mesenteric glands, are the affections to which such are subject.

It can therefore scarcely be questioned, that parts undergoing development, from the necessity of active nutrition during that process, are exposed to greater danger than those which have attained their proper maturity; and as we have seen that the predisposition to disease is evident in particular organs, which give unequivocal proof of their liability to derangement during growth, so we may naturally conclude that all parts, when growing, are more exposed to the action of the great variety of exciting causes of disease. Where the active agent of development is in full exercise, any interruption in one part, by disturbing the equilibrium of the process, will produce an inflammation or congestion, either in the part itself, or in the contiguous structure from which it receives its supply of fluids. The derangement will be in proportion to the healthy organic action of the part, if the principle in physiology be correct, that an organ is disordered in proportion to its previous activity. Vigorous circulation in the organs, and an abundant supply of blood-vessels in the tissues, render children extremely liable to sudden inflammatory affections, rapid in their progress, and too often fatal in their termination; effusion quickly following an acute attack of disease, of serum in serous membranes, as the arachnoid, or of lymph in the mucous membranes, as in the trachea.

The extreme excitability of the nervous system, from the excess of vitality, also will cause a sympathetic irritation in other organs, which themselves become proportionably disordered, from their own naturally exalted action at this period of life. This strong disposition to sympathetic disorder is a peculiar source of danger; for, however slight or unimportant the original or primary affection may have been, the complication induced in an organ, on whose normal action the well-being of the child depends, becomes the cause of serious and fatal symptoms; the degree of danger often depending on the importance of the parts complicated in the disease.

Thus it appears that the excess of vitality dependant on development is the source to which the great frequency of diseases in children is to be traced, and from the same cause, rendered far more dangerous by the sympathetic participation of other organs. Their diseases are for the most part sudden, and the participation of other parts, especially the brain and its membranes, no less sudden and severe: the disordered affection soon passing through its course, and, if its acute action continue, terminating in effusion and death.

The practical deductions from the suggestions and facts here set forth are, first, to meet the diseases of children in their invasion with promptness and decision, whatever be the remedial means resolved on; and secondly, never, under the most discouraging circumstances, to consider any case as hopeless.

Much valuable time may be lost by a temporising method; such a course, if even ever admissible, can be so only when the acute symptoms have disappeared. Perhaps the physician is called too late to take the case under his care with energetic and active treatment; indeed, the symptoms even of severe affections may be obscure, and the oppression of the circulation impart a languor and feebleness to the frame when important organs are affected, not only giving the parents no suspicion of danger, and thus causing delay in the employment of proper remedial means, but also not unfrequently being a source of embarrassment to the physician in his diagnosis. But when the disease is seen in its commencement, and especially if it be strongly marked with inflammatory or congestive symptoms, decided measures should at once be adopted, and the disease, if possible, be at once cut off; for upon measures promptly and judiciously used at the commencement, the life of the child may altogether depend. These may often be followed with singular benefit by such remedies as will tranquillize the morbid excitement of the nervous system, administered according to the prevailing symptoms, and the nature of the affection, and thus prevent the lighting up of disordered affections in other organs. It is not intended here to specify either diseases or their remedies, but simply to suggest the general principles on which the diseases of children are best managed, depending, as they do for their production, on the important agency of a superabundance of vitality; views which are fully borne out in practice, the only true test of the correctness of any theory.

In the second place, from the powerful activity of all parts engaged in supplying, developing, and repairing the structure, when once the violence of the disease is removed, the physician should never abandon the child, however hopeless the case may appear to be. Where vitality is in so great activity, the powers of the system are adequate to almost any reparation, and are often exhibited to an extent, and under circumstances of depression, which will leave him without excuse who would regard any case as beyond the reach of remedies. It is true these instances do not make their appeal to us so much by their numbers, as by the evidence they give of the strong inherent power of the body to resist destruction at the commencement of life, and thereby afford a powerful inducement for increased endeavors to add to the numbers already increased five fold in the space of three centuries. Since the natural tendency of the body at this early period is—not to die—but to live, to increase, to unfold itself, and by successive developments to become, by degrees, fitted to the high station in animal and intellectual life for which it was destined, how does it behoove those who have assumed the important charge of its preservation, to use all the efforts which enlightened science affords, to assist the natural inherent powers of the system in resisting any tendency to dissolution, at a period of existence when dissolution is in reality an unnatural process of the structure.

With the knowledge of these facts before us, and of the progress already made in the nature and seat of disordered affections—with the still greater insight into the mysteries of other departments of physical science which has been attained, and the control which this knowledge has enabled us to exercise over some of the most powerful agents in nature, is it too much to hope that the bright beams of science, still dispelling the clouds which obscure the operations of the organic kingdom, may exhibit to our view the nature of the secret actions which give to living bodies the powers they possess, and thereby enable us, also, promptly to control their actions and to arrest their aberrations? And thus restore to their wonted energy the deranged and disordered functions, on which the integrity of the structure and the life of the individual depend.

TREATISE

ON THE

DISEASES OF CHILDREN.

VITAL FUNCTIONS.

RESPIRATORY SYSTEM.

PECULIARITIES OF THE RESPIRATORY SYSTEM.

The respiratory organs consist of the nasal fossæ, larynx, trachea, lungs and its membrane, together with the thorax, on the movements of which the act of respiration depends.

The air passage through the nose varies in children in its form but little from that of the adult, and its comparative size is about the same. It differs in this respect from the passage to the lungs formed by the larynx and trachea, which is much smaller in proportion to the body. The larynx especially develops itself much more slowly than other parts, and consequently does not acquire its full form for some years. Another remarkable feature in the development of the larynx is, that it is irregular in different children, not undergoing the same changes in all, so that it is smaller in some subjects than in others who are even younger.*

At the time of birth, the cartilages, bones and muscles of these parts are very small and flexible, and all the cartilaginous rings are distinct, as in the trachea of an adult. At this period it is not unusual to find the larynx and trachea filled with mucous secretion, apparently without the existence of disease, to so great an extent as to interrupt, and even prevent entirely the function of respiration, producing in the new-born child complete asphyxia.

The larynx, but more especially the glottis, remains of a very small size for a very long time, differing but little in a child of three years and one of twelve. This smallness of the size of the glottis, is the reason that affections of those parts that are attended with any tenacious secretion, or tumefaction of the lining membrane, are so highly dangerous in children, for a complete closure of the opening may ensue even from slight causes. This condition occurs from the plastic exudation of croup, and in the œdematous state of the epiglottis, diseases remarkably fatal in young children. The different capacity of the opening, in some instances, may also be one of the causes of the frequent attacks of suffocating diseases in some infants, while others are for years quite exempt from affections of this nature.

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* Manual of Gen. Descrip. and Pathol. Anat., by J. F. Meckel; translated by A. Sidney Doane, M. D. Vol. III., p. 338.

At the age of puberty, however, the difference is so great, that the glottis doubles in length and breadth in the course of a year; hence the remarkable difference observed in diseases affecting these organs at an early time of life, and after the period of puberty, when there is an almost entire exemption from those symptoms which characterize these affections in young children. The bronchiæ, also, during the period of childhood, are quite small, but enlarge at the same time that the larynx undergoes a change.

The size of the thorax is proportionally smaller than any of the other cavities of the body during infancy; but on account of the greater length of the cartilages of the ribs, in proportion to the osseous part, it possesses much more elasticity, and thus in a measure compensates for its deficiency in size.

The lungs in the fœtus are only a dense mass of organized substance, of a brownish color, entirely different in appearance and texture from the lungs of a child after respiration has been established. These organs are of a bright rose color, inclining to red in young infants; in youth they are of a darker color, but do not assume their permanent hue until about the age of twenty years, when they appear of the well-known marbled color of adult age.

The functions of the lungs present the most remarkable changes of any occurring in the infant frame; for when in a normal condition, they almost instantaneously perform their appropriate function on the application of their natural stimulant, thus changing at once the condition of the child from a parasitic to an independent state of existence.

Respiration is carried on with great activity in an infant, amounting to thirty-five or forty inspirations in a minute, those of the adult being about eighteen or twenty in the same period. Although this is stated to be about the number of inspirations, yet it is extremely difficult to ascertain the fact with much precision, for when the thorax is uncovered in order to observe its movements, the exposure causes an immediate acceleration in the action of the respiratory muscles. Nothing, therefore, can be ascertained with any degree of satisfaction, when desirous to obtain information from this source, as to its indicating the violence of diseased action. When they are noisy, from any obstruction in the nasal passages, the respirations may be counted.

A remarkable circumstance in the manner in which respiration is performed by an infant is, that the ribs alone are the chief agents, the diaphragm acting but little, the size of the abdominal viscera not permitting it easily to descend. Infants, when sucking, breathe altogether through the nose; when this is obstructed by tenacious mucus, great difficulty is experienced both in breathing and sucking. The nose is, therefore, at this period, an important appendage to the respiratory apparatus.

Children at all ages, but especially during infancy, require a free supply of pure air, as is evident from the fact of the great number of deaths in large cities, and more especially in the crowded alleys, densely-populated houses, and hospitals for young infants, or under any circumstances where there is an evident insalubrity of atmosphere. All animals, especially when young, have been known to suffer from this cause. In Paris twenty-five per cent. of the deaths are children under the age of two years, in London twenty-eight per cent., and in Philadelphia about thirty-three, and in New York a trifle less.

On percussion, the chest of a child is very sonorous, owing both to the small development of the muscles covering the part, and to the free and active condition of the ultimate termination of the bronchiæ; and it is probably owing to the same cause that the respiration in children is much louder than that of adults; and when a portion of the lungs is required to perform more than its ordinary amount of functional power, from disease existing in its vicinity, a similar sound is heard by auscultation, and has for this reason been called puerile respiration. This remarkable condition of a child's lungs exists until about the twelfth year, when respiration assumes the characters peculiar to it in the adult.

On the establishment of respiration, the child cries, caused doubtless by the painful impression made by the cold air, for the first time applied to the surface of the body and lungs; this feeling of excitement, or perhaps some degree of distress, appears from the rapid movements of its arms and legs.

Physiologists have long attempted to account for the agency by which the first inspiration is effected.

It was the opinion of Whytt, that the fœtus received blood already prepared for it by the mother, and that when this supply ceased, an instinctive feeling, analogous to hunger, took place in the chest, by which the child naturally sought for air to supply the existing want. The brain excites the motion of the chest, thus preventing the fatal effects that would follow a quiescent state of the lungs.

This appetite for air commences at birth, from the excited circulation arising from the struggles of the child; a quantity of blood is thus sent through the lungs, and becomes the direct cause of the desire.*

Haller ascribed it to the habit of opening the mouth while in the uterus, in swallowing the liquor amnii. When this motion is repeated, on the child's being ushered into the world, the air finds its way in, and passes directly into the lungs; blood is distributed through them on their expansion, and a continual supply of air is required to prevent the blood from stopping in its progress from the right to the left side of the heart.† Darwin adopts a like view of the subject in reference to the habit of moving the mouth in the uterus; but this can not, he thinks, be the sole cause of the first inspiration, for breathings and deglutition are different acts. The fœtus, at birth, experiences an uneasy sensation from the want of air, for the relief of which, all the muscles of the body are thrown into action, and those of the thorax, together with others, by which the uneasiness is relieved.‡

The French physiologist, Adelon, supposes that the successive development of the lungs and their appendages predisposes them to the act of respiration. As the lungs increase in size, and the pulmonary vessels enlarge, the ductus arteriosus becomes less, whereby the lungs are prepared, on their being properly excited, to discharge their proper functions. The contractions of the uterus, also, prepare the fœtus for the new change, by pressing the blood out of the placenta, and thus deranging the circulation. By this derangement in the distribution of the blood, an additional quantity of blood is sent to the lungs. A new impression is then made on the child by the action of the external air; its coldness and weight make a painful sensation on the skin and other parts of the body. These impressions are conveyed to the brain, and reflected to the different parts of the muscular system, through the nerves; the muscles of inspiration, as well as the others, receive this impression, transmitted by the nerves, whereby they are excited into contraction.§

The views of Dr. Philip are, that the muscles of inspiration are altogether under the control of the will, and are brought into action by the uneasy feeling which the fœtus experiences on being separated from the mother, analogous to the first act of deglutition; both acts arising from the will, and producing the contraction of certain muscles for the relief of unpleasant sensations.‖

Dr. Bostock's opinion is, that it is entirely of a mechanical nature, arising from the elasticity of the parts, from the removal of the pressure to which the body was subjected while in the womb.

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[*] Whytt on Vital Motions, sec. 9, p. 111. [†] Elements of Physiology, viii. 5, 2.

[‡] Zoonomia, vi., sec. 16. [§] Physiologie de l'Homme, p. 20.

[‖] Wilson Philip, M. D., in the Quarterly Journal, vol. xiv., p. 100.

the expansion of the trunk depending merely on the removal of this pressure.*

Dr. Marshall Hall, in his valuable work on the nervous system, explains the establishment of inspiration by the action of the excito-motor system of nerves, whereby the cold impression on the trifacial nerves, and also on the spinal nerves, distributed extensively over the cutaneous and mucous surfaces, is transmitted to the medulla oblongata, and thus stimulates the nervous centre which reflects the necessary stimulus to the pneumogastric nerve. This is experienced every day in a very marked manner on the birth of a child. The fœtus in the womb, surrounded by the warm liquor amnii, is but little exposed to the action of any stimulus on the cutaneous surface: but no sooner is it subjected to the sudden change of temperature, arising from the exposure of the body to the cold air, than an immediate excitement takes place at the minute origin of the incident nerves, which is transmitted at once to the centre, to be reflected in the manner just mentioned. It is a very common practice, when the infant does not breathe, to expose it more freely to the influence of the air, to blow, or to sprinkle a little cold water on the face, when a sudden catching or sobbing ensues.

The cry of an infant demands some attention, as it not unfrequently affords some indications of disease; it should therefore be the duty of the physician to become acquainted with the natural cry of an infant. The division of the cry made by Billard, is one which is considered by all of great practical use, founded, as it is, in the philosophy of nature.

His division of the cry is into the cry proper, and the interval, or reprise. The former is produced by expiration, while the latter is the sound formed by inspiration, and appears to be caused by the sound of the air passing through the glottis in order to reach the lungs.

The reprise is heard but little in a young infant, and increases in intensity as the child advances in age; it is the predominating sound heard after a child has been exhausted by crying, and known by the name of sobbing.

The crying of a young infant is unconnected with the shedding of tears. The secretion of tears is remarkably dependant on the mental emotion arising from sorrow; it would appear, therefore, that as the brain of a young child can not combine ideas, its distress is altogether of a physical nature.

Crying is not always an expression of severe pain, but often of some uneasiness and instinctive want, arising from the position of the body, uncomfortable arrangement of clothes, or hunger and

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* Elementary System of Physiology, by John Bostock, M. D., vol. ii., p. 31.

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thirst. This may be known by the cries occurring at intervals, and also by being easily calmed.

The peculiarity of voice in childhood appears to be connected with the cartilaginous condition of the larnyx, and the cry or natural language is caused by that tube alone, without the assistance of the organs of articulation. Although there are changes occurring in the larynx during childhood, yet there is nothing very appreciable until the period of puberty: at this time a change occurs in every part; the opening of the glottis becomes larger, and the cartilages and muscles of speech increase in size. These changes are observed to occur in the male, in whom an alteration of voice takes place; in the female but little change occurs, and the voice continues without much alteration.

The thymus gland is an organ composed of distinct lobes, situated at the upper anterior part of the thorax of the fœtus; it lessens in size after birth, and entirely disappears about the twelfth year. From a continued enlargement of this body after birth, it has been supposed to become a cause of some distressing and fatal affections in infancy, arising from the obstruction to the breathing which it produces.

SIGNS OF DISEASE FROM THE RESPIRATORY SYSTEM.

Crying being the first and most common expression of distress in a child, the peculiarities arising during this act naturally attract our first notice; and by a close and watchful attention, the cry of a child may enable us to make some kind of a diagnosis of its diseases.

When crying is remarkable for its strength and obstinacy, and especially if accompanied by an expression of distress in the face, with pallidness, it is a sign of the existence of severe pain, arising from protracted disease.

It is sometimes sudden, and accompanied by an accelerated movement of the respiratory organs; it is then an evidence of a violent and sharp pang, as that arising from the pricking of a pin, or a sudden paroxysm of pain: this occurs in peritonitis and spasmodic affections of the bowels. This sudden crying, or screaming, sometimes becomes protracted, when it indicates the presence of local inflammation, or continued pain from the pressure of the teeth on the gums. It is broken up into short paroxysms when the respiratory organs are the seat of the inflammation, from the severe pain which is produced by the act itself.

In prolonged disease the cry will not be continued throughout, but will falter, and have a dying sound at its close. This kind of cry is found in diseases of a very serious nature, as gelatinous

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softening of the stomach, chronic pneumonia, inflammation of the brain and pericardium. In severe pain there is an acuteness in the cry, both in inspiration and expiration. From its occurring in the active stage of hydrocephalus, M. Manuoir, of Geneva, has denominated such a cry, *hydrencephalique*, and regards it as peculiar to that disease: it will, however, mark the existence of any severe pain.

The cry may sometimes be interrupted or intermittent, characterizing affections of the larynx, and is caused by spasmodic affections of the muscles of the voice. This sound is peculiar to croup. The sound on inspiration is that which is distinctly heard, while the other is lost. The alteration in the tone, which is something between a cry and a cough, imparts to it a crowing sound, and is produced by a sudden intermittent movement of the larynx.

This acuteness of tone produced by inspiration, occurs also in inflammation of the mouth, propagated to the tonsils and larynx, and may be regarded as a distinctive sign of inflammation in the trachea or larynx.

When the sound of the voice is husky, it is a sign of catarrhal affections, and arises from the thick mucus obstructing the bronchiæ, and preventing the air from circulating freely through the tubes in its passage to the glottis.

The imperfect cry gives a moaning sound at times, and in newborn infants is a sign of extreme debility; the child using no muscular effort. Under such circumstances, and when following much inflammation, it is almost a certain precursor of death.

Moaning is also an unfavorable indication, when it occurs with sudden stupor, after violent excitement, accompanied by screaming; these, together with sighing, and a drawling and nasal sound, indicate cerebral affection, bordering on effusion. When it is simply an indication of pain in the bowels, and accompanied with a drawing up of the lower limbs, so common in spasmodic affections of the stomach and bowels, it is not to be regarded as indicating anything serious.

Fretfulness is in general a sign of simple uneasiness, and if long continued, denotes the invasion of some disease, and should, on this account, never be overlooked, as the successful treatment of infantile disease often depends on the early stage at which the proper remedies are used. It becomes important, therefore, when accompanied by other indications of disease.

The voice in older children gives the same indications of disease as in adults, being shrill in spasmodic affections of the larynx, as in Millar's asthma. Hoarseness occurs in catarrhs, inflammations, and thickening of the mucous membrane of the larynx, and often remains for life, after an attack of croup or measles.

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Hiccup is produced by a sudden expansion of the thorax, and narrowing of the glottis, from a spasm of all the muscles of inspiration. In children the cause usually lies in the intestinal canal; it may also arise from an affection of the nervous system, and especially in cerebral diseases. It often exists, without being a dangerous symptom, in irritations of the stomach or intestines, from any cause; but should there have been any inflammation of the intestinal canal or peritoneum, the prognosis is unfavorable.

Sneezing is a sign of an inordinate stimulation of the mucous membrane of the nasal cavities, and in children is usually an evidence of a local inflammation in these parts; it may occur in irritations of the intestinal canal, from worms and other causes.

Cough indicates a general disease of the respiratory organs, either idiopathic, from disease of the larynx, trachea, bronchiæ, lungs, or muscles of respiration; or it may be sympathetic of irritation in the bowels, either from saburra or worms—a very common cause of coughs in children. Sometimes great anxiety precedes the cough, as in hooping-cough, when the nervus vagus is affected. A single short cough denotes pleuritis; on the contrary, a paroxysm of coughing comes on in catarrh with profuse secretion, and in hooping-cough.

In intermittent cough there is great nervous irritation, with or without organic changes of the organs; it is chiefly observed in croup and hooping-cough.

A constant cough is a sign of inflammation of the larynx, bronchiæ, or lungs.

A harsh tone in the cough is a sign of catarrh; a barking tone, of croup. A whizzing tone, without harshness, is an evidence of catarrh of the bronchial mucous membrane, before the secretion, which characterizes this affection, has appeared. The sound of the cough in hooping-cough is distinguished by its loud shrieking character.

A dry cough appears at the commencement of catarrhs and inflammations of the respiratory organs, and is of short duration when the inflammation is seated in the mucous membrane, and continues longer in pneumonia, and other serious affections of the lungs.

In judging of the frequency of respiration, the age of the patient should be taken into account, as the frequency is much greater in young than in older children. The varieties resulting from sex, or mental emotion, are not, as in adults, of any account in young children. When the last-mentioned cause influences the respiratory organs in children, crying is produced, which takes the place of the rapid breathing observed in adults.

Frequency of respiration occurs when a portion of the lungs is unable to perform its office, or when a more than ordinary quantity

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of blood passes through these organs in a given time. In the former case the frequency arises from disease of the lungs, or an affection of their walls; in the latter, from the increased quantity of blood passing through them, as in a paroxysm of fever. The prognosis may in general be favorable, when the frequency diminishes with the disappearance of fever, as it may be regarded as arising from the increased circulation attendant on a febrile state.

A quick respiration is denoted by the rapid motions of the thorax; in protracted disease it is of a very unfavorable import.

Strong respiration marks a great exertion of the respiratory muscles, and denotes more especially disease of the air passages, particularly of the larynx, and a narrowing of the bronchiæ. It also occurs when the lungs are loaded with blood, during a violent paroxysm of fever. Sometimes this kind of respiration becomes difficult, constituting dyspnœa of authors; it occurs where portions of the lungs are impervious to the air.

When respiration is rare, the cause exists in the debility of the muscles of respiration, as is frequently seen in infants that are premature, or that are born feeble. If it is at the same time quick, it is an evidence of pleuritis, or of great debility occurring after violent exertion in coughing, in pneumonia, chronic bronchial catarrh, or effusion into the cavity of the pleura.

The species of respiration which is performed by the upper part of the chest, indicates very serious disorders of the thoracic viscera, as it is in proportion to the difficulty of ordinary respiration. That kind which has been called cervical, is performed by the exertions of the muscles of the head and neck, and is an evidence of the highest grade of difficult respiration in diseases of the lungs. Cephalic respiration is of common occurrence in pulmonary diseases of children, and is known by the mouth and nose moving violently in expiration and inspiration. It is produced by a mechanical obstruction of the lungs, as their engorgement in pneumonia, effusions in the air cells, closure of the glottis in croup; and is an instinctive movement to increase the volume of air, and gives a very unfavorable prognosis.

Inspiration is very difficult in diseases of the larynx, œdema of the glottis, or in any affections of this part, constituting what has been called Millar's asthma, and in most cases of croup, and causes the peculiar sound of these diseases. Expiration, on the contrary, is the most difficult part in diseases of the bronchiæ.

In chronic diseases of the lungs, a form which not unfrequently occurs in children in that peculiarity denominated lobular inflammation, there is a gradually increasing dyspnœa, which is an unfavorable sign. Regular respiration is a favorable phenomenon, while irregular respiration is connected with a state of extreme debility

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from cerebral affections. If this amount to cessation in breathing, it is then intermitting, and is very unfavorable in cerebral affections and pneumonia.

In healthy respiration, inspiration is of longer duration than expiration; but in cases where inspiration causes great pain, as in pleuritis and peritonitis, it is cut short, and the relation is inverted. Inspiration is performed with great difficulty in diseases of the larynx, œdema of the glottis, inflammation of the epiglottis, and in most cases of croup. Expiration is the most difficult part of respiration in affections of the bronchiæ. When a deep inspiration and free expiration occur without pain, and the ordinary respiration is frequent and difficult, it is an evidence that the disease is not seated in the respiratory organs, but is a sympathetic action arising from disease in another part. The knowledge of this fact is of some importance in children's diseases, but can not be made available in the case of infants.

In healthy respiration, no sound is perceptible by the ear removed from the chest. It becomes sibilous in laryngitis, œdema of the glottis, and in croup. When it produces a sighing sound, the cause is generally in a congested state of the lungs, or debility of the respiratory muscles; when it occurs in diseases of the brain, and acute hydrocephalus, it is an unfavorable sign.

When it is necessary to obtain still more correct results by means of auscultation, the method practised in adults will be applicable to children, taking into account the age, sex, and temperament, of the patient.

The respiratory sound is very remarkable in every part of the chest in children, forming the puerile respiration, and therefore does not become a sign of diseased action, as in adults. A slow respiration takes place in very debilitated infants, and marks a diminution of the action of the heart; yielding an unfavorable prognosis.

Diminished intensity of the respiratory murmur shows that there exists inflammation of the small bronchial ramifications, or obstructions in them from mucus; its entire absence, with bronchial respiration, shows the existence of pulmonary induration or pleuritis.

Auscultatory sounds, in general, do not vary from those described as existing in adults, and therefore need no further notice than a reference to them in the monographs devoted to their consideration. The stethoscope is not so easily used as in the adult, on account of the continual motion of the child; it is much easier to apply the ear to the chest.

Percussion may be employed by elevating the child in the air with one hand, while the sound is obtained by the other. When the pleximiter is used, it will be advisable to employ two at the same time, that the sound at the diseased part may be compared with that of the unaffected portion. The sonorous nature of the chest in young children greatly favors the employment of percussion; and in simple pneumonia there is either a complete dulness, or so evident an obscurity in some parts, as to contrast very strongly with the clearness of sound in another. Those most experienced in the examination of children by this method, prefer the direct application of the fingers to the intervention of a pleximiter.

DISEASES OF THE RESPIRATORY SYSTEM.

ASPHYXIA.

The literal meaning of the word asphyxia, is a deprivation of pulse, σφυξις with the privative α; although the term is restricted to the loss of the heart's action from one cause alone—that of interruption of respiration, or, in the case of new-born children, to an entire absence of the exercise of this function. Pulsation may continue for a while after the birth of the child, without respiration; yet, if this be not established, the child must soon die. Pulsation may also be entirely absent in the cord, and the child be apparently dead. The term asphyxia will be used as applicable to all these conditions in which a child may be born, without living the extra-uterine or independent life, and thus include in its signification its original meaning. The condition of still-born children, therefore, from whatever cause, whether from oppression of the brain, or mechanical or other impediment to the establishment of respiration, will necessarily come under the title which forms the head of this article.

ETIOLOGY.—The causes which produce the apparent death of new-born children have generally been considered by authors in a very vague and unsatisfactory manner, if, indeed, they have been at all alluded to, except in so far as they have been the subjects of the immediate observation of our senses. Professor Mende, of Gottingen,[*] has however thrown some light on this subject; and from a careful examination of the cases which have come under his notice, has made the three following divisions of asphyxiated children.

In the first class he includes every species arising directly from the condition of the whole nervous system of the fœtus not yet being fully capable of receiving impressions; the child, consequently, occupies a much lower grade than is usual. In the second class he places those that arise solely from the brain, caused either by a sudden or protracted pressure. In the third, are comprised those cases which depend on the imperfect condition of certain organs, or on some diseased state in which they happen to be at the time of birth, without the action of which, the nervous system can not be excited to act. The organs of respiration and circulation are those which come under this class.

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[*] Analekton uber Kinderkrankheiten; Stuttgard, 1834, part I., p. 94.

According to this view, all the causes of asphyxia can be satisfactorily arranged. In the first class are those children who are born feeble, from various causes affecting the mother during gestation, and also from a constitutional debility entailed by the father. Extreme youth of the parents, debilitated constitutions, from whatever cause, induced either from sickness or habitual intemperance, bad nourishment of the mother, etc., all have their influence in causing an imperfect development of the fœtus, and thus producing a diseased condition, which, according to its degree, renders the child unsusceptible to external impressions. In this class of causes may also be placed a diseased or deficient placenta or umbilical cord. As these are requisite to the proper nourishment of the fœtus, so their healthy condition is essential to the well-being of the young animal. Its structure has been found changed, and a part ossified or indurated; it has also been found preternaturally softened. Tumors and hydatids, also, have been seen growing in its substance;* these changes, although not affecting the life of the fœtus, may yet, if extensive, very materially interfere with its nourishment. The umbilical cord may also become varicose, and even burst, greatly weakening the child, although it may not die.† It has also been found tied in knots,‡ which, if tight, must necessarily impede the flow of blood to the fœtus, and thus deprive it of the necessary nourishment. An instance of this rare condition of the umbilical cord has very recently occurred to the writer; the knot, however, was not drawn so tight as to impede the circulation.

From these and other causes children may be born in a state of feebleness, rendering them almost incapable of extra-uterine existence, without being necessarily affected with any serious lesions, as has been proved by post-mortem examinations.‖

A sudden detachment of the placenta, with hemorrhage, is another cause of asphyxia in children, from depression of vital power; so, also, is premature delivery. This state occurs in almost all premature children, to a greater or less degree, and in mature children, where there is evidently a deficiency of vital energy, from disease or imperfect nutrition.

The second class, or that depending on the brain, may be divided into those which occur before delivery, and such as occur during the birth of the child; in both arising from strong compression of the brain. Apoplectic stupor may follow a tedious labor, where a continual pressure of the head occurs in the bones of the pelvis, or from the continued powerful action of the uterus, artificially induced by the use of ergot. The contractions of this organ acting principally on the placenta, still attached to its surface, force an inordinate quantity of blood into the body of the child, and it is protruded, bearing all the evidences of a general congestion, existing to such an extent as to clog and arrest the circulation.

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* Burns's Midwifery, p. 206.

† Baudelocque, sec. 1084.

‡ Mauriceau, Cases 133–136.

‖ Billard on Diseases of Infants; Amer. edit., p. 59.

This apoplectic condition may also arise during birth, after protracted and severe labors, when the uterus, from exhaustion, suddenly ceases to act when the head is expelled, which may remain in this situation for some considerable time. Dr. Collins* states, that he has known several children to have been lost, where the action of the uterus was tardy after the expulsion of the head; and advises, in cases where the pains do not return in three or four minutes, to use gentle traction, especially where the child does not breathe. The encircling of the neck by the umbilical cord, may also be a cause of the same apoplectic condition, and produce a state of asphyxia, which, if not speedily relieved, will be fatal. Pressure on the head, from the use of instruments, will not unfrequently have the same effect, and the child will be born, to appearance dead, while the injury, and even a loss of the cerebral substance from the crochet and perforator, will not at once destroy life; for children injured in this manner have cried loudly after delivery, and even lived for some days.

The effect of tedious labors, and of compression, especially of the umbilical cord, are often evident in children who are born to all appearance dead, without any pulsation in the funis, but not in a state of apoplectic stupor; such instances almost invariably occur in breech and footling cases, especially in the first parturition.

The too early application of the ligature on the cord, will also sometimes cause an embarrassment of the respiration, with the usual appearances of a disordered circulation, sometimes to an alarming extent.

The third class includes all species of asphyxia, from any obstruction to the passage of air to the lungs, or debility of the respiratory muscles. Congenital malformations of the thorax, trachea, or lungs, which prevent a free expansion of the organs, must interfere materially with respiration, and in some instances prevent it altogether. Malformations of the lungs themselves are rare, and must of course interrupt respiration to a greater or less extent; the congenital congestion of these organs, and their hepatization, will also prevent respiration, and cause the death of the child, either immediately or a short time after birth. In connexion with a congested state of the air passages, is that condition, arising apparently from a slight degree of inflammatory action, which has been observed on dissection, where the existence of a quantity of mucus obstructs the passage of the air, and very materially impedes the respiratory function. This mucus is at times so tenacious as to adhere to the parts which it covers almost like paste or glue; even causing the tongue to adhere with considerable firmness, to the roof of the mouth.

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* Practical Treatise on Midwifery, &c., containing the result of 16,654 births in the Dublin Lying-in Hospital, p. 5; London, 1836.

Another cause has been stated as hindering the establishment of respiration, but which can scarcely occur, except from great carelessness or ignorance; it is that of the unruptured state of the enveloping membranes, by which the child remains entirely covered for some time after birth; the air being altogether prevented from coming in contact with the organs of respiration, the child must of necessity perish.

Semeiology.—Children are sometimes born in a state of complete and universal feebleness, produced by the causes first mentioned, and are unable to perform the respiratory functions except by short inspirations or sobs, followed by sighs at considerable intervals. This state will continue for a long time, the intervals becoming longer, and the inspirations less deep, until the child at length sinks from mere debility. On other occasions, especially where suitable measures are adopted to foster the little remains of vitality, the respiration will be gradually improved, and the full exercise of the function established. Symptoms similar to these will occur in cases of malformation of the thoracic parietes, or hepatization of the lungs; the respiration being impeded in proportion to the degree of these affections. In other instances, children are born without any evidences of life, the whole body being in a state of flaccidity, and the cord destitute of pulsation. The surface of the body is pale and without circulation, and the whole appearance of the child indicates the almost, if not entire abandonment of vitality.

When the child is born in an apoplectic state, from any of the causes above mentioned, the face appears bloated and purple, and the surface of the body red, but retaining its ordinary warmth; no difficulty can exist in detecting the cause of the absence of respiration in such cases, differing as it does so evidently from other conditions. In addition to these symptoms, the cord still beats with its usual strength.

The most common condition in asphyxiated children, is that which occurs without any turgescence of the face, or any other evidences of cerebral congestion, but with the existence of a slight strangulation in the efforts to breathe, clearly pointing out the existence of mucus in the air-passages as a cause of this embarrassment. When no efforts are made to breathe, the body is then pale and lifeless, while pulsation continues in the cord.

Pathology.—The pathology of this affection is evident from the causes which have been detailed. In cases arising from mere debility, imperfect nutrition, or immaturity of the child, great emaciation, or extreme smallness, will be the condition of the body, as will very naturally be expected.

In those instances arising from apoplexy, sanguineous congestion of the brain and spinal marrow is found to exist, by which the nervous power destined to stimulate the muscles to action is arrested. Effusions of blood have also been discovered beneath the arachnoid membrane, rarely in the ventricles, according to the experience of Cruveilhier, who has examined several of these cases.* This effusion of blood is found to exist more particularly at the posterior part of the encephalon, while there is no rupture on its surface.

Congestion or hepatization of the lungs, also, is not an unusual condition on which the defect or absence of the respiratory function immediately depends. This sanguineous congestion being a common occurrence in young infants, a slight excess of it would very easily obliterate, to a considerable degree, the air-passages. To this cause, also, is the mucus, so often found to embarrass the respiration of children, to be attributed; showing itself in a viscid tenacious state, or in that of a yellowish white matter, of the consistence of cream, in the bronchiæ.†

Treatment.—When a child is born without breathing, the first means which should be resorted to for the purpose of establishing respiration, is to ascertain if there exist any viscid mucus clogging the air-passages, and removing it if it be found there, by introducing the finger to the back part of the mouth, while the face is turned downward. If it adhere and abound in the fauces, the finger should be covered with a soft rag, and then being carefully applied to the back part of the mouth, the mucus should be disengaged. If these be ineffectual, and the non-establishment of respiration appear to depend entirely on the presence of this mucus, further efforts ought to be made, by elevating the lower part of the body, and gently striking the back between the shoulders, with the hand. Attempts ought in all cases to be made, whatever be the cause of the want of respiration, to remove the thick mucus adhering to the fauces and larynx.

* Anatomie Pathologique, vol. 5, plate 1. † Valleix, Traité des Enfants, p. 567.

A child is not unfrequently still born without the evidences of any feebleness which would endanger its life, and all that it appears to require is to excite the respiratory action, which, on account of some degree of congestion perhaps, remains unaffected by the ordinary stimulus of the air. This excitement, which is usually effected immediately on the exposure of the face to the cool air, may be artificially induced by stimulating the excitor nerves distributed on the face, by blowing or forcibly sprinkling cold water on it, or by exciting the spinal nerves with a gentle slap with the palm of the hand on the nates, limbs, or thorax. Every one knows the effect of dashing cold water in the face of a patient in a state of syncope; an immediate catching and sobbing arises from the transmission of the stimulus to the medulla oblongata, and thence to the nerves controlling the respiratory functions.

When great feebleness exists, which is often but temporary, some stimulating substance may be applied to the mouth and nostrils, as brandy, hartshorn, etc.; or the vapor of the former may be applied so as to stimulate the respiratory function into action, by rinsing the mouth of the accoucheur with it, and breathing into the mouth of the child. While pulsation continues in the cord, it must by no means be divided, for we have still the fœtal life to sustain the child, in the place of the independent life. During these efforts, while the face is exposed to the cold air, if the establishment of respiration be protracted, the body ought to be kept warm by means of warm flannel applied around it, as the loss of caloric will rapidly carry off the remnant of vitality.

If the pulsation in the cord have ceased, it ought to be divided, and the child plunged suddenly in a hot bath, of the temperature of 100°; the momentary application of the stimulus of heat will often at once restore respiration. From the experiments of Dr. Edwards,* no advantage can arise from continuing the child in the bath: the benefits are derived from the suddenness of the shock, and the stimulating influence thus communicated through the excitor nerves to the centre of the system, and thence reflected to the pneumogastric; when the respiratory function is instantly stimulated to action. The body should be enveloped in warm dry flannel, and all unnecessary fatigue ought carefully to be avoided. In cases of difficulty in the establishment of respiration, it not unfrequently happens that the same causes which at first prevented it, will continue to operate in a greater or less degree for some days, requiring constant attention; the circulation being excited by warmth and gentle frictions while the child is kept perfectly at rest, and carefully nourished. Enemata of castor oil are also of great benefit, the languor of the system, and the cold and leaden color of the extremities, being often very sensibly relieved after their use.

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* On the Influence of Physical Agents on Life, p. 283.

In the case of asphyxia from congestion of the brain, the abstraction of blood from the divided cord is the remedy which promises the only hope of success, as the resuscitation depends mostly on the removal of the congestion. This can very easily be effected, by simply dividing the cord while pulsation continues. If, however, it should have ceased, efforts to procure blood may still be made, by immersing the end of the funis in warm water, or by surrounding it with a fold of flannel saturated with hot water, while the discharge of the blood is assisted by squeezing the cord with the fingers. Although bleeding in this manner has its foundation in reason, corroborated by the experience of most practitioners, Baudelocque, Burns, Dewees, Eberle, etc., yet it has found objectors, from the fact, that the death of the child has ensued after the use of this remedy; an objection which would apply to every remedial measure, whenever it was improperly used, or the condition of the patient placed him beyond the reach of any remedy. The livid and swollen appearance of the face proves the superabundance of blood, and that its abstraction is the only rational and effectual means for removing this preternatural fulness. As to the quantity which should be taken, this depends on the effect produced: no more should be drawn than is necessary to relieve the congested state of the brain. While these efforts are in operation, the proper measures should be adopted to restore directly the action of the respiratory functions, by stimulating directly the pneumogastric, the proper nerve of the respiratory act; a course which should, under all circumstances, be pursued. For this purpose, artificial respiration ought to be tried, by attempts to inflate the lungs.

To effect this object, the nose of the infant being carefully closed, and a piece of folded muslin interposed between the mouth of the accoucheur and that of the child, the lungs should be inflated by gently breathing into them, while expiration is induced by compressing the thorax, in imitation of natural respiration, while the head is extended slightly backward, to allow the air to pass more freely through the upper part of the larynx. The practitioner ought, before he commences this process, to make several full inspirations, and thus expel as much carbonic acid from his own lungs, whereby a better supply of oxygenated air will be conveyed to the child. This is all the inflation that is required; the use of a tube or bellows never being needed in the case of a still-born child. In experiments made on adult animals, life has speedily been destroyed by these mechanical means. Artificial measures of this kind should, therefore, never be used, as a rupture of the air-cells might easily ensue. An instance of the effects of forcible insufflation is given by Dr. Eberle, occurring from the use of ordinary measures resorted to for the purpose of establishing respiration, which in this instance was not effected. A tumor appeared over one of the clavicles, which, on examination, proved to have arisen from the rupture of the air-cells of a portion of the lungs; the emphysema extending over a considerable portion of the surface of the pleura.*

The alternate dilatation of the chest by inflation and compression, should be repeated at short intervals, until natural respiration has commenced. This is known by a deep, sudden catch, followed by a prolonged expiration or sigh, with a considerable interval between the respirations at first: the intervals gradually becoming less, respiration at length assumes its regular action, the cry of the child first giving the evidence of its complete establishment, and is one of the best proofs we can have of the vigor of the infant. According, therefore to the strength of the cry should we estimate the vigor of the child; and if this be powerful, strong, perfect in both its parts, and well sustained, we may, without fear as to the result, direct the child to be washed and dressed, which, without these evidences of the strength of the child, have produced a fatal exhaustion.

Upon the subject of tying the cord, there have been different opinions as to the proper time. Some have maintained that the pulsations in the funis should cease entirely before the application of the ligature; while others have contended that it is only necessary for the child to breathe and cry vigorously, to admit of the tying and separating the cord. The former practice is undoubtedly the safest, although abundant experience proves that but little hazard can arise where the respiration is fully established, although the pulsation may not have entirely ceased. For a long time after breathing has commenced, pulsation will continue near the body of the child, while it will be found that it has entirely stopped near the placenta. An unnecessary delay may be avoided, by first ascertaining the effect of compression on the cord between the fingers; when the pulsation is found to be quite feeble, and easily arrested by the compression, without the appearance of any disorder in the circulation, the ligature may then be applied, and the cord divided with the most perfect safety.

Where any malformation exists, it is obvious that but little can be effected by artificial means; those already detailed will be those most applicable, according to the prominent symptom, if the conformation of parts allows of any hope of success in the use of them.

Under all circumstances, particular attention should be paid to the temperature, for, from a disregard to this, numbers of infants doubtless have perished: for next to respiration, the maintenance of a proper warmth is of absolute necessity to the preservation of the life of the young child. Between the temperature of the womb and that of the body, there exists a difference, never less than 30°; the sudden effect of this change, like that from heat to cold, acts as a powerful stimulus to the circulation; but when this effect is accomplished, no benefit can possible arise from a continued or an occasional exposure to cold, but on the contrary, decided injury must arise from the continual abstraction of heat, where the power of its production is but feeble, and where the degree is less than in adults. Inattention to keeping a sufficient supply of warmth, independently of any unnecessary exposure, has sometimes proved fatal in a few days, resisting all endeavors to remedy the condition of coldness and depression when this state has been discovered. A continual moaning and sighing, together with a shrunk and bluish appearance of the face, and a leaden color of the hands, will point out, with unerring certainty, the condition of the child, demanding as close attention to preserve life as an imperfect condition of the respiratory function. Among the other auxiliary means, is the employment of a warm enema composed of gruel or warm water, its temperature being about 100°. Warm barley-water, or warm milk and water may also be given to the child with a teaspoon by the mouth, and the effort of the child to suck when the spoon is placed within the lips is an indication of the freedom from danger. After the restoration of the child, it is not uncommon for a complete relapse of all the symptoms of asphyxia to take place, and for want of proper care death will ensue. The child should therefore be carefully watched, and a repetition of the remedies, more particularly of those which will excite the respiratory act by the stimulation of the nervous excitors, ought to be perseveringly employed.

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* A Treatise on the Diseases and Physical Education of Children, by John Eberle, M. D.; Philad. 1837, p. 79.

In those cases of labor where the body of the child is delivered some time before the head, there is great danger of the child's being lost, from the continual compression of the cord, before there is an opportunity for the mouth to be exposed to the atmosphere. Dr. Bigelow* has shown that the life of the child, under such circumstances can be saved, even if the size of the head and the resistance of the pelvis and soft parts render the delivery of the head by traction either difficult or hazardous, by forming a communication between the mouth and the atmosphere, before the delivery of the head. The fingers should be introduced, so as to reach the mouth of the child; when this is accomplished, the hand is to be raised from the throat of the child, making the ends of the fingers a fulcrum, and pushing the perinœum backward, by which the air will be admitted as far as the chin. The middle fingers are then to be separated, and a free passage will thus be made to the mouth. If the mouth be situated too high to be reached with the fingers, or if, from great compression, it is found difficult to pass the fingers, Dr. Bigelow recommends the use of a flat tube, made of gum-elastic, or spiral wire covered with leather, about half an inch at its largest diameter, to sustain life during the retention of the head. He even thinks it practicable to inflate the lungs under these circumstances.

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* American Journal of the Medical Sciences, August, 1829.

BRONCHITIS.

Bronchitis, or inflammation of the lining membrane of the bronchiæ, is of frequent occurrence in children at every age, varying from a slight degree of irritation with mucous secretion, to a severe phlegmasia of the mucous membrane. When slight, or attended with but little inflammation, but exhibiting a copious secretion of thin mucus, it is that form of bronchial disease known under the name of catarrh. As the term catarrh implies simply the existence of inordinate secretion, and relates to the secretion only, without reference to the pathological condition of the part, it will not here be considered as a distinct disease, but included in the description of bronchitis, of which it forms but a symptom. Any peculiarities, therefore, which bronchial catarrh assumes, on account of which it has been described as a distinct affection, will be considered under the present head.

Etiology.—This disease is most apt to occur in cold, wet, and variable weather, during the spring and winter. Not only may the exposure to the atmospheric vicissitudes become a cause of bronchial inflammation, but cold applied to the surface of the body in any way, as damp clothing, accumulation of urine for a long time without changing, etc. Smoke, or irritating gases, may also excite an inflammatory action in the mucous membrane of the respiratory passages. Bronchitis also arises from the constitutional irritation attendant on teething, as other inflammatory diseases are excited by the same cause, according to the peculiar predisposition of the child; an important practical fact, to be kept in view in the treatment of all affections of children. It may also occur on the disappearance of an eruptive disease, when it often becomes protracted and obstinate, resisting, for a long time, the measures adopted for its removal.

Semeiology.—On the first appearance of the disease there is a chilliness of the surface of the body, which is soon followed by a quick pulse and hot skin. Cough is usually present from the commencement, at first slight, increasing gradually in hoarseness, and as the disease advances, accompanied with pain, which in young children may be known by a violent cry. The cough, at the commencement, is unattended with any secretion of mucus; but shortly after the invasion of the disease a free secretion of mucosity takes place, which increases in quantity until the complete transmission of air to the air-vesicles is prevented, and all the distressing symptoms of suffocation present themselves; the countenance becomes anxious, and the prolabia livid; all of which are aggravated on placing the child in a recumbent position. The coughing is often attended with strangling, and paroxysms of threatening suffocation, until relief is obtained by vomiting. These symptoms are, toward the termination of the disease, sometimes attended with convulsions or stupor. The disorder of the respiration accompanies the other symptoms in their march, and as the latter increase in intensity, becomes more oppressed and difficult.

Percussion yields a clear sound in every part of the chest at first, but different portions become dull toward the termination of the disease. Auscultatory examination discovers the existence of the mucous ronchus, and it may even be heard without applying the ear to the chest, or without the intervention of the stethescope. The use of this instrument in severe cases can scarcely be dispensed with, if we are desirous of making a prognosis of the disease; and if we discover its peculiar characteristic, the mucous ronchus pervading the whole of the chest, and the inflammation occupying the bronchiæ of both lobes, great danger may be feared if much constitutional derangement also exist. If, on the other hand, it is discovered to be partial, our prognosis may, in general, with ordinary constitutional vigor on the part of the child, be favorable, although the paroxysms of coughing and difficulty of respiration may be severe and exhausting.

In very young children bronchial catarrh may often arise without any evident cause, and will scarcely exhibit any other symptom than the mucous ronchus, or a short, noisy respiration, without any distinct sound, which may be so denominated. When it attacks young children, it will at times continue during the whole period of lactation; on other occasions it will increase in intensity in a very insidious manner, attended at first with no evidence of pain or distress. As the affection in this form advances, the breathing attracts attention from its peculiar wheezing character, almost imperceptibly changing to dyspnœa, and attended with drowsiness. This laborious respiration occurs for the most part in paroxysms, leaving the child during the intervals free from any urgent symptom, if the quiet drowsiness which generally attends it is not regarded as such. This, however, is one of the most fatal signs, and this form of bronchitis, when once it has made strides thus far onward, is scarcely to be arrested by remedial means. One peculiarity is, that cough, so distinctive in ordinary bronchitis, is not always present in this form, and therefore is no mark of the disease. The pulse is extremely quick, while the skin is cool and moist.

A variety of bronchitis known by the names of catarrh and catarrhal fever, has at times prevailed epidemically, and been exceedingly fatal to children. The symptoms are much the same as those of ordinary bronchitis, but with much greater depression at the commencement; the coolness and languor, and contracted condition of the surface, often lasting a whole day before the febrile reaction is fully developed. It appears to be a secondary affection, connected with a great derangement of the secretions of the chylopœtic viscera; the liver being in a torpid condition, and the alvine evacuations either deficient in bile, or giving evidence of its absence altogether. Convulsions and drowsiness also occur toward the close of the symptoms, and are always to be regarded as indicating an unfavorable termination, arising as they do from congestion in the brain and medulla oblongata, produced by the increasing obstruction in the pulmonary circulation, which thus crowds these organs.

Among other varieties of this disease is that described by the late Dr. Parrish, of Philadelphia, as the congestive catarrhal fever.* It commences in the usual manner observed in bronchial inflammations, but without the febrile symptoms noticed in the ordinary bronchitis. The symptoms are those usually observed in all congestive fevers. The pulse is frequent, but gives no evidence of fulness and activity in the circulation. The skin is cold and pale, and free from any dryness. The primæ viæ partake also of the general torpor of the system, and the bowels are inactive; but the discharges do not give evidence, as in the last-mentioned variety, of any derangements in the hepatic system. The cough, like that of the ordinary form of bronchial affections, is at first dry, but becomes moist during the progress of the disease. The most marked symptom, however, is the dyspnœa of a violent and distressing character, which induced Dr. Parrish to regard it as a spasmodic affection, and to treat it as such. It is exceedingly fatal to young infants, seldom lasting more than two or three days, and is almost beyond the control of remedies; the excessive local congestion, and the loss of vital power, of which this is an evidence, make the use of ordinary remedies of little avail.

Morbid Anatomy and Pathology.—Autopsical examinations show the bronchial mucous membrane in a state of increased vascularity, as appears from the injection of the capillary vessels with blood; it is often thickened, but seldom softened. On account of the obstructions in the bronchiæ, the lungs do not collapse on opening the thorax. A thin but tenacious fluid fills the entire substance of the lungs. Mucus, more or less thick, is usually found in the ramifications of the bronchiæ, sometimes mixed with purulent matter, similar to what is occasionally discharged from the mouth in very severe cases of the disease, that have been quickly fatal. In other instances some degree of hepatization has been found in the lungs, particularly at its lower posterior portion: apparently the first progress of the disease toward pneumonia. Tubercles have at times been found at the root of the bronchiæ, and in the lungs.

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* Observations on a Peculiar Complaint in Children. N. A. Med. and Surg. Jour. Vol. I., p. 24.

TREATMENT.—The treatment of acute bronchitis must be strictly antiphlogistic, and adapted to the urgency of the symptoms. When called early, the disease may be removed by the administration of a little syrup of ipecacuanha, every ten or fifteen minutes, until vomiting is induced, followed by pediluvium.

The abundant secretion of mucus in the air-cells will often produce a difficulty of breathing almost at the commencement of the disease in infants, from their inability to expectorate; the early exhibition of an emetic, therefore, becomes an important remedy for the relief of the distressing dyspnœa arising from this cause. This condition may in general be known by the cough being less at the commencement. When there is much inflammation, the cough is more urgent, and there is a destitution of secretion to a greater or less degree.

If there exist but little febrile action, and the disease is of a slight character, the chest may be rubbed with some stimulating application, and a warm emollient poultice afterward applied. In using embrocations in inflammatory affections of the chest, ammonia, which is so commonly employed, made into a liniment, should be avoided, as the fumes arising from it will tend greatly to aggravate the existing inflammation.

If the disease be not alleviated at once by these measures, no time should be lost in availing ourselves of the principal remedy in the management of active inflammation, especially if there is pain in the chest, when blood should be taken from the arm of the child, until an effect is decidedly manifested in the pulse. In robust children, bleeding by the lancet is indispensable when there exists much heat of skin and febrile action, or much difficulty in respiration. To be decidedly beneficial, it ought to be employed early. If the evidences of bronchial inflammation continue, leeches may be applied to the upper part of the chest, immediately under the clavicles. After bleeding, if but little febrile action follow, a blister should be applied over the chest, a means which ought not to be neglected in the treatment of bronchitis. It ought not to be left on until complete vesication has taken place, for in children the ulcerated surface left after a severe blister is often very difficult to heal, and extensive sloughing has followed its use. If, however, the violence of the circulation has not been relieved, it would be well to attempt to allay the fever and dyspnœa by such remedies as relax the system. Nauseating substances, as ipecacuanha or tartar emetic, are used for this purpose; and, given in small and repeated doses, so as to act, also, as an emetic, will be found of great benefit in the treatment of this affection.

Tartar emetic can not be used without some hazard in young children, and I know of two deaths that occurred from poisoning with this substance, in small doses given medicinally. Professor Hamilton, of Edinburgh, also mentions the occurrence of fatal effects from its use, but refers it to the child having taken the medicine on an empty stomach; he therefore advises that the child be allowed to suck or drink before taking it. With this precaution, from one eighth to one sixteenth of a grain of tartar emetic may be given to a child from six months to a year old, every ten minutes, until vomiting ensue; when there is evidence of gastric inflammation, its use should be avoided. Vomiting is peculiarly serviceable in every stage of this disease; and where there is much accumulation of mucus in the bronchiæ, should be employed so as to act promptly, and thus relieve the tendency to congestion of the lungs, by removing the mucus which clogs the extreme branches of the air-passages. A very excellent combination is that so often used, composed of antimonial wine and syrup of squills;* it is more useful where free secretion has taken place in the bronchiæ. Antimony, by itself, is more applicable to the first stage of the complaint, while the mucous membrane is in a state of inflammation. To quite young or new-born children, syrup of ipecacuanha is preferable, as the dose may be exceeded without any unfavorable effects following. A teaspoonful may be given to a child three or four months old, every ten minutes, until vomiting be excited, and half that quantity to one within the month.

From the commencement of the disease, the bowels should be kept in a soluble state by the use of mild laxatives, but no advantage can arise from free purging. In robust children, a few grains of calomel, combined with rhubarb and ipecacuanha, may be given at first, and the bowels kept in an open state by the use of the annexed laxative prescriptions.[*]

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* ℞ Vin. Antim., ʒij.
Syrup. Scillæ, ℥iss. M.
A teaspoonful every ten or fifteen minutes, until vomiting ensue.

℞ Pulv. Ipecac., ℈j.
Antim. Potass. Tart., gr. j.
Oxymel. Scillæ,
Syrup. Simp.,
Aquæ Font., āā. ℥ss. M.
For children three or four years old, from one to two teaspoonfuls.

Where the secretion is slow in taking place in the inflamed membrane, and the violence of the disease, and the constitutional disturbance attendant on it, are in a measure allayed, expectorants will be indicated. Any of the nauseating articles may be used for this purpose. The efficacy of tartar emetic is greatly increased by its union with some alkali, probably from its facilitating the absorption of the medicine.[†] But when there is a decided relief of the febrile symptoms, those of a more stimulating nature may be used, as the syrup of squills, in doses of ten or fifteen drops every two or three hours, to a child of two years. As its operation is by stimulating the capillaries, and thus exciting secretion in the diseased membrane, it is counter-indicated in the active form of the disease. It may be judiciously combined with other articles which act also as expectorants, and thus obtain the combined influence of different remedies of the same nature, but acting in different modes.[‡]

In the last stages of the disease, when it has assumed a chronic character, more stimulating expectorants will be needed, and the senega snake-root (polygala *senega*), so useful in croup, will be found of great efficacy. Some mucilage ought to be combined with it when it is given in decoction, in order to allay, in some measure, its acrid properties.[‖] In very advanced stages of this disease, and in its chronic form, when attended with much debility, it may become necessary to add some stimulant, to prevent the prostrating effects which sometimes follow from its free action on the

[*] ℞ Hydrarg. Subm., gr. x.
Pulv. Rhei, ℈j.
Pulv. Ipecac., g. j.
Syrup. Simpl., ℥ss. M.
One third is a dose for an infant.

℞ Mannæ, ℥ss.
Emulsio. G. Arab., ℥ss.
Syrup. Violæ, ʒij.
Bene Admisce, et adde,
Aquæ, ℥j.
From ʒj. to ʒij. every three hours, until an effect be produced, for an infant.

℞ Ol. Ricini, ℥ss.
Syrup. Rosæ, ℥ss.
Vitel. Ovi, un.
Tinct. Sennæ, ʒiss. M.
One to two teaspoonfuls, for an infant, every hour.

[†] ℞ Antim. Potass. Tart., gr. j.
Sub. Carb. Potass., ʒj.
Syrup. Simpl., ℥ij. M.
A teaspoonful every two hours.

[‡] ℞ Vin. Antim., ʒss.
Oxymel. Scillæ, ℥ss.
Potass. Tart.,
Ext. Glycyrrh., āā ʒj.
Aquæ, ℥j. M.
One or two teaspoonfuls, for an infant of twelve to eighteen months.

℞ Oxymel. Scillæ,
Syrup. Ipecac., āā. ℥ss.
Succ. Glycyrrh., ʒj.
Mucil. G. Acaciæ, ℥ij. M.
A teaspoonful once in two hours, to a child of a year old.

[‖] ℞ Infus. Senegæ, ℥ij.
Syrup. Scillæ, ℥ss.
Mucilag. G. Acaciæ, ℥ij. M.
A teaspoonful once in two hours, to a child three years old.

bowels. Ammonia has been added for this purpose; this, together with an anodyne, will sometimes be needed to meet bad cases of prostration.[*]

Although, as a general rule, narcotics are to be avoided where it is necessary to keep up the secretions from the affected part, which is the indication throughout the whole period of bronchial inflammation, yet it may at times become advisable to allay the violence of the cough, which is often so great in protracted cases as greatly to distress the child, and deprive it of rest. A combination of Dover's powder with calomel and squills will be found highly useful when an anodyne is needed,[†] or either of the following mixtures, as the case appears to require;[‡] and often the most salutary alterations will occur from the use of anodynes in long-continued cases, by allaying the morbid irritability to which children are so greatly subject, and allowing the powers of the system to rally from the wearing out of the nervous energy. When the skin becomes moist, they may be used with safety, care being taken to prevent the bowels from becoming constipated. The sanguinaria *canadensis* has been extensively used in pulmonary affections; being an active stimulant, it is only useful in protracted cases, where the stimulation of the bronchial membrane becomes necessary to excite its secretion. In addition to these measures, the condition of the gums should be examined; and if the teeth appear pressing on the gums, a free incision ought to be made; and indeed it should be our duty, in the first place, to examine whether the irritation of teething be not the exciting cause; for, as was before remarked, where children are naturally predisposed to bronchial affections, the constitutional disturbance arising at the period of dentition may be its sole cause. A great deal of useless treatment may be prevented by attention to this subject. After a child has for some time had a free discharge of saliva, under the irritation produced by the pressure of the teeth on the gums, the affections of the bronchiæ are very liable to make their appearance when it is arrested. If, therefore, the mouth be found dry, and the gums swollen, the gums over the protruding teeth ought to be freely divided.

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[*] ℞ Decoct. Polygalæ, ℥jss.
Carbonatis Ammoniæ, gr. iij.
Tinct. Cinnam.,
Syrupi Tolutani, āā. ʒij.
Syrupi Papav., ʒij. M.
ʒi.—℥ij. every second hour.

[†] ℞ Pulv. Doveri, gr. x.
Hydr. Subm., gr. iij.
Pulv. Scillæ, gr. i.,
Sacchar. Alb., ʒij.
Div. in pulv. No. vi. M.
One to be given once in four or six hours, to a child of two years.

[‡] ℞ Tinct. Camph. Opiat., ℥ss.
Vin. Antimonii,
Succ. Glycyrrh.,
Pulv. G. Acaciæ, āā. ʒij.
Aquæ Fervent., ℥iv. M.
A teaspoonful every two hours, to a child of six months.

℞ Vini Antimonii, ʒj.
Ext. Hyoscyam., g. iij.
Syrup. Simpl., ℥ij. M.
A teaspoonful every two hours, to an infant from six to twelve months.

℞ Ext. Belladonæ, g. j.
Syrup. Ipecac., ℥j. M.
From five to ten drops, to a child of a year old, in troublesome cough.

In those cases which occur in connexion with the derangement of other organs, and which are dependant on them, the treatment must of course be directed to the removal of the primary cause of the disease. Affections of the liver, which, under some epidemic influence, have preceded the bronchial disease, and on which it appears to depend, must receive our first attention. The object of the physician must be to restore the healthy action to the liver, by removing its congested state. A full dose of calomel will be required for this purpose, followed in a few hours by some laxative mixture. A free discharge of bilious matter will be the best evidence of the relief of the congested liver. In cases exhibiting severe congestion, or inflammation of the pulmonary system, bleeding will be a necessary part of the treatment; and in other respects the treatment need not differ from that adopted in cases of ordinary bronchitis.

In the congestive catarrh, described by Dr. Parrish, a similar course of treatment will be needed, as the engorgement of the blood-vessels of the lungs constitutes the disease; but as congestion is accompanied with great loss of vital energy of the system, and, indeed, as it is an evidence of this want of vital power, we should be cautious about abstracting blood, until some degree of reaction is produced by external stimulants. A large sinapism ought to be placed over the chest, and the feet and legs immersed in a stimulating bath. If these means fail in producing reaction, the child ought to be immersed in a warm bath, rendered stimulating by the addition of salt; blisters may then be applied to the legs, and on the appearance of a restoration of the circulation to its ordinary vigor, blood must be drawn as freely as the condition of the child will admit.

The most important agent in the prevention of bronchial affections in young children, is the preservation of a uniform temperature; for the changes in atmospheric heat is one of the most common causes of the complaint. A great deal has been formerly written on the advantages of early exposure to the changes of the air; and even the practice has been urged, of daily immersing a young infant in cold water, for the purpose of hardening it, and enabling it to resist the deleterious influences produced by alterations of temperature; those individuals who, from necessity have been much exposed to atmospheric vicissitudes, having the power generally of resisting the effects of cold. But such practices are extremely reprehensible toward young children, and those who resist them prove thereby the robust vigor of their constitution. The power of producing animal heat, and, consequently of resisting the effects of external cold, is different in all animals at different periods of life. When young, the natural instinct of all, teaches them to seek the genial warmth afforded by the mother, and her first desire is to impart it to her offspring. Mr. Hunter has proved that the young animal has less heat than the adult, and its power of evolving it much less;* they must, therefore, be more liable to the baneful effects of cold. From experiments made by Edwards, in the Hospital des Enfants, at Paris, it is evident that the temperature of infants at the time of birth is at its minimum, and that it increases with the advance of age; it is obvious, therefore, that they would be unable to bear the abstraction of heat with the same safety as adults at this early period. This important principle is borne out by some recent French statistics, which show a great mortality, during the cold winter months, among infants, who are taken out at a very early age, at all seasons, for the purpose of being baptized and registered.

How important, therefore, does it appear to attend to these matters, as a preventive of the pulmonary affections of children, especially in a climate so variable as ours! I am far from being an advocate of the opposite extreme of complete seclusion and undue tenderness, thereby destroying the stamina, and developing a morbid susceptibility to external cold; but would, on physiological principles, urge a strict attention to the subject, and the adoption of rational views in the prevention of disease in children.

In proof of the beneficial effects of constantly maintaining an equable temperature in preventing bronchial inflammations, or, as they are usually termed, common colds, I would mention, that in those families where a temperature of a moderate degree is uniformly preserved throughout the winter, by means of hall stoves, I have had but few instances of these diseases to witness, compared with those where such means of warming the house have not been in use. A remarkable and very unfounded prejudice exists in the minds of some on the subject of warming houses in this manner, not considering that it is far preferable to the warmth of a single apartment which is constantly exposed to the changes produced by the opening of the door, and that in a room warmed by means of an open fireplace, continued streams of cold air are always passing from the crevices toward the fire, and children are thus exposed to the effects of cold. A fire, placed in a stove in the lower part of a house, will preserve a uniform temperature throughout every part; and if all the doors in apartments are kept open, a vast mass of air will be thus warmed, which will not be liable to be changed in its temperature by the admission of air from without, as is the case in a small apartment; while a free circulation is maintained throughout the house by the rarefication produced by the stove in the lower part.

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* Observations on certaim parts of the Animal Economy, etc., by John Hunter, F. R. S.; London, 1837, p. 134.

PNEUMONIA.

This disease is unnoticed by any other than modern writers as an affection of children. The ancients speak only of hooping-cough as a distinct affection, and confound all other pulmonary disorders under the general name of cough; and even among many of our modern systematic writers it has not attracted the attention which its importance demands. Underwood passes it by almost unnoticed, simply mentioning it as connected with pleurisy and pulmonary catarrh. Mr. Burns and Dr. Hamilton scarcely allude to this frequent and distressing disease of childhood, except incidentally, when treating of catarrh and bronchitis. The more recent work of Evanson and Maunsell contains scarcely a page on the subject; that of Dr. Eberle has but little in relation to pneumonia, but some valuable remarks on its kindred affections, acute bronchitis and congestive catarrhal fever, while Dr. Dewees does not mention it at all. Although all these diseases have been considered as distinct, yet there was no attempt, until the essay of M. Dugès,[*] to make any proper distinction between them. The articles of M. Guersent in the Dict. de Méd., and the theses of MM. Legert[†] and Denis,[‡] together with that of M. Brunet[‖] and Dr. Gerhard,[§] and the extended remarks of Mr. Valleix, furnish the most valuable assistances in the proper diagnosis of the pulmonary affections of children. The paper of Dr. Cuming[¶] is exceedingly valuable on account of its judicious character, and the highly practical nature of his remarks on the treatment of this affection. The more recent work by MM. Rilliet and Barthez,[**] has supplied some important distinctions overlooked by other writers, in relation to the precise pathology of the disease, and in showing, also, the existence of the acute form of lobular disease, which had been unnoticed by others.

From the investigations of the above-mentioned pathologists, it is evident that pneumonia, in children of tender age, presents characters which differ greatly from the disease as it occurs in adults. These peculiarities will be noticed hereafter more particularly; it is sufficient here to remark, that its characters are derived from the inflammation affecting the lobules. The period at which it assumes characters corresponding with a similar affection in adults, is fixed, by Dr. Gerhard and MM. Rilliet and Barthez, about the age of six years, seldom exhibiting the same anatomical peculiarities at an earlier period of life. The disease may attack children when in perfect health, or, what is of more frequent occurrence, makes its invasion in those that labor under some other affection, during the progress of which, an insidious form of pneumonia, with very obscure symptoms, often appears. Such cases have been denominated latent, and would often remain undiscovered without the aid of auscultation. The disease, therefore, naturally presents itself under the forms of acute and chronic, or idiopathic and symptomatic pneumonia.

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[*] Recherches sur les Mal. les Plus Import. et les moins Conn. des Enf. Nouveau nés; Paris, 1821.

[†] Essai sur la Pneumonie, des Enf.; Paris, 1823.

[‡] Recherches Anat. et Physiolog. sur quelques Mal. des Enf.; Comercy., 1816.

[‖] Mem. sur la Pneum. Lobulaire., Journ. Hebdom., 1833.

[§] American Journal of Med. Science, vols. xiii., xiv.

[¶] Transactions of the Assoc. of Fellows and Licentiates of the King and Queen's College of Physicians, Ireland, vol. v., p. 28.

[**] Mal. des Enfans. Affections de Poitrine, Prem. Part. Pneumonie; Paris, 1838.

ETIOLOGY.—Among the predisposing causes is age, which, from the little attention bestowed on the subject until within a few years, would scarcely be supposed to be, as it in truth is, the most frequent. Children between the ages of two and five years, on post-mortem examinations, show a greater number of lesions of the pulmonary tissue than is to be found at any other age. In sixty cases of this disease, mentioned by MM. Rilliet and Barthez, forty were between the ages above-mentioned, and twenty from six to fifteen. M. Hache, quoted by these authors, mentions that in one hundred and eight autopsies, he met pneumonic inflammation in seventy-one between the ages of two and five, and but thirty-seven from the latter age to fifteen.* An hereditary tendency, also, is one of the usual predisposing causes, and ranks next to the early period of growth and development. I have had frequent opportunities of noticing the great tendency to pulmonic inflammation in the children of some families.

This disease, in its acute form, is more prevalent in the spring and winter; in its chronic and complicated form, it is found to prevail more in the summer season. In many instances it can not be traced to any well-ascertained cause; but variations of temperature, even where they can not positively be ascertained, are doubtless the most common agents in the development of this disease, especially when combined with moisture. The acute variety may arise during the existence of some acute disease, as measles and other eruptive disorders.

As to the chronic form, it makes its invasion in the youngest children in a very insidious manner, after an attack of some kind of eruptive fever; but generally after a chronic inflammation of the bowels. Almost any protracted affection, and the general derangement of the health from this continued irritation, as well as the excitement of the system during the process of dentition, may become a cause of chronic inflammation of the lungs. M. Billard regards the pneumonia occurring in young infants as caused by the state of the blood in their lungs: the blood under these circumstances becoming a foreign body, and producing its effects by mechanical engorgement; and adduces, as one reason, the frequency of its occurrence on the right side, from the custom of the nurses in the Hospice des Enfants Trouvés placing the children on that side when laying them down;* but the frequent occurrence of inflammation of the lungs in the right lobe, in adults as well as in children, will not admit of this explanation being sustained.

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* Op. Cit., p. 77.

Semeiology.—The attack of acute pneumonia is for the most part preceded by symptoms of a slight catarrhal affection of indefinite duration, and other evidences of inflammation of the mucous membrane of the bronchiæ, which, extending to the substance of the lungs, is soon followed by all the signs of a decided inflammation of the pulmonary tissue. When the disease is fully formed, there is no disease of infancy which presents a higher degree of fever than the one under consideration. The skin becomes hot and dry, the pulse exceedingly active and full, beating from 120 to 160 times in a minute. The pulse, which at the commencement of the disease is generally hard and full, during its progress becomes very feeble, and toward the close almost imperceptible, and is one of the best means whereby a prognosis of the disease may be made.

The cough is dry and painful, and performed with great effort, and is usually either preceded by a cry, or accompanied by some other evidence of pain. The frequency and fulness of the cough are good signs of the violence of the disease. When the former exists, with marked efforts to resist it, the disease is in proportion serious; when, on the contrary, the cough is infrequent and full, and performed without pain, there exists, comparatively, but slight affection of the lungs. In children, until the age of three to five years, cough usually precedes the other evidences of inflammation; while in those that are older, this symptom shows itself simultaneously with others. The cough is sometimes entirely suspended toward the close of the disease; a return of the cough, after it has for a time entirely ceased, is to be considered a symptom of convalescence. In some cases, the cough indicates the extension of the inflammation to the trachea and larynx, and is known by the hoarse, ringing sound, peculiar to croup. Expectoration, it is well known, never occurs in infants at the breast; or rather, the expectorated matter, which is of a white color, tough and stringy, is never ejected from the mouth except by vomiting. M. Valleix has noticed the discharge of a viscid froth from the mouth, slightly bloody, evidently from the bronchiæ, for a similar product was found in these tubes on post-mortem examination. In older children, however, it takes place as in adults; and a free discharge of mucus is a favorable symptom.

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* Op. Cit., p. 406.

The breathing, in acute pneumonia, is very much quickened above its natural standard, and may often be counted from sixty to eighty in a minute. Dr. Cuming even mentions, that in one case of a child of six months there were no fewer than one hundred and eighteen in a minute. The respirations may be intermittent, returning to the natural slowness for four or five respirations, and again becoming frequent, for about the same period. The respiration, as the disease advances, becomes laborious, as is evident from the heaving of the chest, the anxious expression of the face, and the alternate contractions and dilation of the alæ nasi. In some instances the lungs appear to be so loaded with blood, as materially to obstruct the circulation of blood through them; and if this congested state of the lungs be the most prominent symptom, and is not quickly removed, the jugulars swell, and the face assumes a livid hue, most remarkable in the lips and cheeks, while symptoms of cerebral oppression show themselves. Under these circumstances the disease proceeds with great rapidity, the respiration becomes irregular, the child sighs and gapes, the circulation loses its force, the pulse becomes small and frequent, and the skin cold. Death ensues from the third to the tenth day after the attack.

The favorable symptoms are, a diminution of all these symptoms of inflammation and congestion, and of the violent constitutional disturbance, such as restlessness and wakefulness, connected with them; while the bronchial mucous membranes secrete freely, and the healthy action is restored to the skin, and the secretions generally show an abatement of the diseased action, and a return to the due performance of the functions of the system.

The chronic form which appears in children where the constitution is impaired by other diseases, is very insidious in its attack, and not unfrequently has proceeded to a fatal termination, with scarcely a suspicion existing of its nature. At other times it shows itself by a short cough, at first dry, afterward with the usual signs of a secretion in the bronchiæ, and frequent respiration, varying from thirty-five to seventy in a minute; the face is partially flushed, and in severe cases, livid. In the generality of chronic cases, however, the skin is cool, face pale, and great emaciation exists, while the extremities are œdematous.

In nearly all chronic cases there exists more or less derangement of the digestive system, and diarrhœa is a very common attendant on this affection. Diarrhœa usually continues throughout the whole period of the disease, and consists of green liquid matters. The tongue is moist, and covered with a yellow fur in the most chronic cases; such as approach more nearly to the acute form, the coating is whitish. Vomiting is of rare occurrence, except when induced by severe fits of coughing. The appetite generally is not impaired, but becomes so in proportion as the disease loses its chronic character, and where the dyspnœa is extreme, is almost gone.

The physical signs of pneumonia are important in the diagnosis of the disease. In the peculiar form of the disease in young children, that in which the lobules are the seat, percussion, according to Mr. Valleix, is of little avail in detecting its existence;* Dr. Gerhard, on the other hand, asserts that percussion is frequently of more utility than auscultation, as a means of diagnosis in lobular pneumonia.† This discrepancy appears to arise from not sufficiently discriminating the different periods of the affection, for it is unquestionably true, that in the early periods of the disease, in its chronic state, when there is but little development of the disease, and the inflammation is scattered over a large surface, with intervals of healthy lobules, but little or no alteration will be found in the sound of the chest on percussion. It is probably only useful when the lung has become indurated or hepatized to some extent, and it is to such cases that the remark of Dr. Gerhard applies, as would appear from the anatomical details of his cases.

When the disease has arrived at the stage in which the change is appreciable by percussion, a dull sound will be heard, in proportion to the extent of the induration; and when the induration occupies the greater part of the lung, the sound is decidedly flat. Nothing, therefore, can be expected to be derived from this method of examination until a considerable change has taken place in the lungs. It is not so with common lobar pneumonia, or simple pneumonia, as it is called by Valleix; here obscurity of sound, varying to complete dulness, is perceptible in every part of the affected portion of the chest, strongly in contrast with the clearness of the healthy portion. This indication of disease often extends with surprising rapidity, and in a few hours, an acute pneumonia, will change its boundaries to a great extent. None but such as have made the experiment can fully appreciate the important information which this fact conveys; and the rapid progress of the disease thus proved, shows how valuable are the few hours at the commencement—opportunities for treatment never to be regained when once neglected.

The peculiar form which infantile pneumonia assumes, will also often prevent the discovery of auscultatory phenomena early in the disease, when the affected lobules are widely scattered. But although, when there scarcely exists any rational symptom, the stethescope detects the presence of mucous or subcrepitant ronchus, at times mingled with dry ronchus: the subcrepitant ronchus often exists throughout the whole of the disease. Bronchial respiration is usually not developed until toward the termination, when the induration has extended to a considerable portion of the parenchyma. This remark, of course, applies to the slow insidious form of pneumonia; for in the active form, as well as in lobar inflammation, bronchial respiration is always found; in the last mentioned, being heard over the entire lung, while in the former, when the case is examined sufficiently early, in a portion of it, but rapidly extending. In those cases, indeed, where from sudden and excessive congestion of the lungs, and the closure of the bronchiæ, the respiration ceases entirely in these tubes, bronchial respiration of course will not be heard. Although, therefore, percussion and auscultation are, together, the means of ascertaining the existence of pneumonia, yet where the latter fails to procure the pathognomonic sign of the disease, other symptoms connected with the rapidity of its development will come in to perfect the diagnosis.

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* Op. Cit., p. 135.

† Amer. Jour., vol. xv., p. 101.

Pneumonia may be distinguished from pleurisy by the following physical signs: The same dulness is observed on percussion; and although in both, extending widely with great rapidity, yet in the latter disease it is unattended with the excessive disturbance of the system noticed in the rapid extension of pulmonary inflammation. While in both the dulness exists, in pleurisy there is nothing of the subcrepitant or mucous ronchus. The distinction between pneumonia and bronchitis is not difficult, if the symptoms already detailed are borne in mind. When the mucous or subcrepitant ronchus is heard in the latter disease, it is uniformly on both sides. This is the only auscultatory sign that may cause these diseases to be confounded. When it is heard at the lower portion of one lung, it is to be regarded as the commencement of pneumonia.

Morbid Anatomy and Pathology.—One of the most remarkable distinctions between the inflammation of the lungs in adults and children, and which has already been alluded to, when speaking of the symptoms, is the affection of separate lobules, instead of a continuous inflammation of the entire pulmonary tissue, which characterizes the disease in the former. This is the form which the insidious invasion of the disease assumes, and which renders its detection often difficult, and without the aid of auscultation, in many cases impossible; for on dissection, small, distinct indurated portions will be found in the midst of lobules free from disease, or very slightly inflamed, while the patient during life, presented but few distinctly marked symptoms of pulmonary affection. This inflammation of the lobules is what characterizes the diseases of the lungs in infancy and early childhood, as it is never found after the age of five or six years. Young children, however, may also be affected with an inflammation of the lobes of the lungs in the same manner as adults are affected, but never, after the age above mentioned, has it been found to partake of the lobular form. While, therefore, autopsical examinations show that the partial, lobular, latent pneumonia ought to be regarded as a peculiarity of the disease in young children, they still have, at times, the true pneumonia of adult age, inflammation affecting the entire lobe; the former being, in a great number of cases, a chronic affection, and such as we might expect to meet with in debilitated subjects, and among those that are treated in public hospitals; the latter occurring in those that are of a robust habit of body, attacked either during health, or while laboring under the influence of some acute disease.

The first stage of lobular pneumonia or induration, exhibits the cut surface of the lung of a marbled appearance of a grayish rose or red color. These red spots are circumscribed to a greater or less degree, and are easily torn; they float in water, and crepitate when pressed.

The second stage is that which is usually met with on dissection. The exterior of the lung is generally found quite soft, and of a gray color, inclining to a rosy teint; prominent circumscribed spots have also been seen, of a firm consistency, and of a violet color. These spots are usually circular, but occasionally vary from that form, and present an oval appearance from above downward; they are observed mostly in the posterior part of the lung, but have occasionally been found in other parts of the organ. The incised surface appears mottled with spots of a grayish rose color, to a deep violet. The dark spots noticed on the external surface of the lungs penetrate the substance, and are, unquestionably, the result of inflammatory action; and all the alterations of structure observed in different parts of the lungs, are from the same cause; differing in no respect from similar disordered action affecting the same tissue in adults.

The third stage is that of suppuration. This condition, according to MM. Rilliet and Barthez, may easily be overlooked, as the color of the lungs has returned to their natural state; but some of the lobules will be found more prominent than the others, and on being cut and pressed, pus will be found to ooze from the surface. Abscesses have also been discovered in this form of pneumonia; and cavities exist, from the size of a hemp seed to that of a pea, and in some instances communicating with the bronchiæ.

These lobular inflammations may increase to a great number, until the entire lung is affected, producing a complete alteration in the appearance of the lung, and which has been denominated by the authors just mentioned, lobular pneumonia generalized.

Other alterations have been found in the lungs of young children, presenting, when cut, a number of granulations of the size of a millet seed, of a yellowish color, containing a fluid of a purulent nature, which can be squeezed out when cut. Again it has been found shrunken, of a violet color, with white lines marking the divisions of the lobules. The cut surfaces of the lungs appear smooth and red, resembling muscle in their structure, and without crepitus on pressure. The violet color shows that it differs from the hepatization of adults, while it bears a resemblance to the condition described by M. Louis, under the name of carnification, and has been so denominated by those who have investigated the pathology of children.

All writers agree as to the frequency of double pneumonia in children, a circumstance of very rare occurrence in adults ; but like the disease in the latter, when it is confined to one lung, it is most usually the right lobe that is affected.

The complication of pleurisy with pneumonia is very frequent in adults, but pleuro-pneumonia is very rare in young children. In one hundred and twenty-three cases which came under the notice of M. Valleix, pleurisy occurred only in twenty instances; a fact which was before noticed by Dr. Gerhard in the paper already referred to.

In young children, all their affections are more or less complicated, with evident derangements of the chylopoetic viscera; and in the disease before us, lesions of the intestinal canal exist, principally of a chronic inflammatory nature, as appears from the condition of the mucous membrane.

Such is the amount of our knowledge on the subject of the pathology of pneumonia of young children; important, inasmuch as the frequently insidious progress of the disease—so slow and imperceptible as to have received the name of latent—might often put us off our guard until the affection has made a fatal progression. When the invasion is sudden and well-marked, it will matter but little whether the disease be strictly lobular or lobar; but as it is proved that the former affection is a peculiarity of young children, and that pathological anatomy has demonstrated the existence of a serious and fatal lesion formerly unsuspected, it will be our duty to ascertain, by the means which modern science has placed in our hands, the existence or non-existence of such a form of disease in protracted cases of infantile affections, and by the timely discovery, to apply the appropriate remedies for its removal.

As to the pathology of lobar inflammation, it differs in no respect from that of adult age. This, as was before remarked, may occur in children at every age, although some have been of opinion that it never appears until after the age of six years; and M. Berton asserts, that it is not until the age of fifteen years that pneumonia assumes all the pathological characters peculiar to the disease in adults.*

Among the effects of inflammatory action in the lungs, is the infiltration of seriosity in their tissue, forming a real œdema of the lungs. This condition is generally attended with very laborious respiration ; but in some cases, extensive œdematous effusions have been found, without this condition having been manifested during life. Mr. Gardien mentions that it will be found without the presence of any antecedent lesion, and after symptoms which threaten immediate suffocation. But this generally is not the case, for it is usually complicated with bronchitis, pleurisy, and pneumonia, and is evidently the result of extensive inflammation in the various tissues and membranes of the lungs.

TREATMENT.—In severe acute pneumonia, the success of the treatment mainly depends on the early period at which the treatment is commenced, and the promptness with which the proper remedies are applied; and, although one of the most violent and serious affections which a physician has to encounter, yet there is none more completely under his control than idiopathic pneumonia. A delay of twenty-four or forty-eight hours may place the patient entirely beyond the relief of remedies. The disease, as was before remarked, when considering its symptomatology, is astonishingly rapid in its progress, involving successive portions of the lungs in its influence, with a quickness, as revealed by percussion, which soon places it beyond the control of art. It is therefore his duty to attack it at once, and extinguish it at its commencement.

The first indication clearly is, to arrest the inflammation by the appropriate remedy of blood-letting, proportioned to the age and constitution of the child, and the violence of the inflammatory symptoms of the disease. On the subject of general blood-letting in children, a difference of opinion has existed among physicians. Dr. Cuming,† Clutterbuck,‡ and others, are strong advocates for its use. Sydenham, also, observes that it may as safely be performed in children as in grown persons, and adds, that "it is so necessary in the peripneumonic fever above mentioned, and in some other disorders to which children are subject, that there is no curing them without it."‖ On the other hand, Professor Hamilton,§ of Edinburgh, Billard,* and some others, principally French and German physicians, disapprove of its use, and recommend leeches as a substitute. Dr. Hamilton objects, it would seem, to the loss of blood in any form in children. There exists in the minds of some a great dislike to the use of this remedy in children; but believing that the fears so often entertained are in many instances groundless, I can not too strongly urge its employment where the attack is recent, and the child in the possession of ordinary vigor, having so repeatedly seen the immediate benefits of this course. It is an error to believe that children do not bear the loss of blood with advantage in inflammatory diseases. They indeed, when the remedy is judiciously and early employed, appear to be more decidedly and promptly relieved than adults, arising doubtless from the simple and uncomplicated nature of diseases in the former. It also arises from their peculiar condition as growing creatures, where the interstitial action is in a state of activity bordering on inflammation, causing their inflammatory affections to assume a violence of character which causes a rapid occurrence of fatal symptoms. Young children do not bear the repetition of venesection well, and when the further abstraction of blood is necessary, leeches must be applied to the axilla of the affected side.

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* Traité des Malad. des Enfants, etc., par A. Berton; Paris, 1837, p. 478.

† Op. Cit., p. 48.

‡ Lecture on Blood-letting, republished in Bell's Select Medical Library.

‖ Account of the Measles of the year 1670.

§ Hints for the Treatment of the Principal Diseases of Infancy and Childhood, p. 84.

Immediately after the employment of blood-letting, a purgative will be found serviceable, both as a revulsive to the intestines, and for its agency in promoting the secretions from the liver and intestinal mucous membrane. There is no class of remedies, however, which appears to exercise so little influence on pneumonia as purgatives; they should therefore be regarded only as assistants to the general treatment, and used principally to remove the fœcal accumulations which are so apt to occur in febrile affections generally. The action of the purgative should be prompt and efficient; for this purpose, calomel, combined with jalap and ipecacuanha, is what I have been in the habit of using. Jalap is an excellent adjunct to other purgatives in children, for its operation is not confined to any particular portion of the intestinal tube; a copious secretion usually follows its use, and when combined with ipecacuanha, as in the subjoined prescription, makes an excellent purgative powder for inflammation of the chest. To keep the bowels free, one or two grains of the same powder may be given every hour to a child of a year old.†

After the operation of the cathartic, if the lungs are still much oppressed, it will be proper to administer an emetic; and antimonial emetics are, in general, used for that purpose, as their operation is beneficial, not only in relieving the loaded bronchiæ of its secretion, but also in restoring the equilibrium of the circulation. Where antimony is deemed hazardous, from the tender age of the child, syrup of ipecacuanha may be substituted, as recommended in the preceding article. The effect, however, of emetics, is not so beneficial in this disease as in simple bronchial inflammation, attended with a free secretion of mucus. Revulsives should by no means be neglected, but the feet and legs ought to be early immersed in a stimulating bath, especially when the violence of the inflammatory symptoms is in some degree abated.

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* Op. Cit., p. 269.

† ℞ Subm. Hydr., gr. v.
Pulv. Jalap., ʒss.
Pulv. Ipecac., gr. v.
Sacchar. Albi., gr. x. M.
From 2 to 5 grains every third hour.

During the continuance of the inflammation, diaphoretics should be constantly used, and any emetic substance acts in this manner when given in small doses; these, and the expectorants recommended under the article on bronchitis, are applicable to the disease before us.

When the inflammatory symptoms are in some respects removed, and the heat of the skin and fever is abated, while evidences of pulmonary congestion or irritation continue, blisters will often be found of great service, applied over the affected part. When secretion becomes free in the bronchiæ, the treatment must be directed to the relief of the symptoms arising from excessive secretion in these tubes, by the use of emetics, which may be varied according to the circumstances of the case; the treatment differing but little from bronchitis, to which subject the reader is referred for the use of the different expectorants and emetics.

The treatment of chronic pneumonia is based upon the same principles which should direct us in the management of the acute form of the disease; all our efforts being directed to diminishing the quantity of blood passing through the lungs. In general, blood-letting should be by leeches, or scarification and cups; which latter method many practitioners prefer, on account of the facility of ascertaining the quantity of blood thus taken. After the abstraction of blood, if this is deemed necessary, as in some debilitated cases it might be deemed hazardous to have recourse even to the smallest quantity of bleeding, revulsives are the remedies principally to be relied on: stimulating baths to the lower extremities, sinapisms to the chest and back. Dr. Gerhard mentions that no bath is superior to the sulphur bath in chronic cases of pneumonia, taking care that the child's face be not exposed to the vapors arising from it, and that he be removed before symptoms of exhaustion arise. The bowels should be kept open with mild laxatives; and when the disease is connected with an inflammatory affection of the mucous membrane of the bowels, and protracted diarrhœa, the remedies recommended under that head must be associated with the treatment. When not counter-indicated by the presence of other symptoms, the use of the more stimulating expectorants will be found necessary. Coxe's hive-syrup, the compound syrup of squills, in doses of five to ten drops every three or four hours, to a child of two or three years, may be found useful for this purpose; or where more stimulation is needed, the subjoined prescription.[*]

PLEURISY.

Pleurisy is a disease of greater frequency in young children than is generally supposed, although occurring less often than either bronchitis or pneumonia; owing probably to the fact that this membrane is less exposed to the immediate influence of the action of the atmosphere. MM. Rilliet and Barthez, on the contrary, say they have very rarely met with simple pleurisy unconnected with other pulmonary inflammation, between the ages of two and five years. Although comparatively rare in young infants, it is found to occur as frequently in children from the age of three years and upward as in adults, and with the same violence. In younger children its appearance is usually insidious, its progress slow, and its character either sub-acute or chronic; but violent acute pleurisy may occur at any age, as I have repeatedly seen, if anything like diagnosis can be depended on.

Etiology.—The causes of this affection are those in general which produce inflammatory diseases, of which cold, applied to the surface of the body, is the principal. As this has been already considered, and the inferences arising from it as to the prevention of disease, have already been alluded to under the article on bronchitis, it is unnecessary here to repeat them.

Semeiology.—When acute, pleurisy commences with the usual symptoms of inflammation: chills, succeeded by febrile excitement. There is great restlessness, and evidently severe pain, as the constant crying of the child indicates. When the pain allows the cry to be free, it is heard clear and distinct, without any other alteration, except such as arises from pain and exhaustion. In addition to restlessness, there exists great difficulty in the attempt to fill the chest: and the dilatation of the thorax is made with great pain, and accompanied with marked contractions of the abdominal muscles. This distress is increased when the child lies on one side. Although at times disposed to cough, yet it is often arrested, from the pain attending the effort. As the disease advances, the difficulty of breathing increases; the pulse loses its force; the eyes appear sunken and livid; the extremities cold and œdematous, and a comatose state ensues before death takes place.

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[*] ℞ Rad. Seneg., ʒss.
Infus. in s. q. Aq. Ferv.,
per ½ hor. colatur, ℥iv.
Adde,
Ammoniæ Hydrochl., ʒss,
Syrup. althææ, ℥j.
A teaspoonful every hour, to an infant of six months.

The disease, however, is sometimes destitute of these strongly-marked symptoms, and will make its advances with signs so obscure, as to render it difficult to detect its presence. The child, in the incipient stage, is for a time languishing and feeble, daily losing its flesh, and crying, as if suffering from some continued distress, which increases on lying down. It will therefore be necessary, from the obscurity of the rational symptoms, to ascertain, from the physical signs, the existence of this or of some other pneumonic disease. It is extremely difficult, it has been asserted by Billard, Rilliet, and Barthez, to ascertain precisely the presence of pleuritic inflammation, as both percussion and auscultation give very uncertain signs of the disease. Unless there also exists some degree of effusion, the physical signs are obscure; they, however, consist of dulness on percussion, and the presence of bronchial respiration. The dulness affects the entire part of the side affected with the disease, while there is less violence in the symptoms than attends a similar extent of pneumonia. As the inflammation decreases in convalesence, the subcrepitant ronchus is not heard, as in pneumonia.

MORBID ANATOMY AND PATHOLOGY.—In acute pleurisy adhesions are found, which, in cases of short duration, are easily separated; a condition entirely different from that which arises in protracted or chronic disease. Besides these, plastic exudations between the pulmonary and costal pleuræ, effusions of lymph, purulent matter, or sero-purulent fluid, are found in the pleural sac. The membrane itself is usually spotted with a number of red points. In chronic cases there exist more extensive adhesions of a firmer character, with appearances of granulations, and evidently of a longer standing.

TREATMENT.—On the first appearance of acute pleurisy, blood must be freely taken from the arm, and permitted to flow until a slight effect is evidently made on the circulation, known by the increasing softness of the pulse, and the paleness of the face. If the child be old enough to describe his feelings, the same rule should be observed as in treating the same disease in adults; the pain should be evidently lessened. On the return of fever, pain, and the usual accompaniments of inflammation, leeches ought to be applied to the affected side. When the constitutional symptoms are relieved, a blister may be advantageously applied, with the precautions already suggested on that subject. The bowels ought also to be opened, and kept in a soluble condition, by means of neutral salts, or the formulæ mentioned in p. 45.

Nitrate of potass has been recommended as a suitable refrigerant and antiphlogistic, in pleurisy of children, as it so sensibly relieves the heat of the body, and diminishes the frequency of the pulse. But, although generally useful in adults, in delicate subjects it has been found to disorder the functions of digestion and assimilation; it is, therefore, inadmissible in the case of young children, uncombined with some article to prevent its too irritating action on the mucous membrane of the stomach; although Henke prescribes it in childhood, in all those diseases for which it is given in adults. Dover's powder is the best for modifying its influence, besides the advantage which may be derived from its controlling the circulation, and relieving the general irritability of the system. The subjoined formula is a form of combination,[*] which will be found very suitable for children, as there seldom exists a disease in them, without the presence of gastric derangement, or its supervention, during the progress of their diseases.

In very robust children, where there is much difficulty in restoring the secretions generally, a combination of calomel, antimony, and nitre, will be sometimes found advantageous.[†]

Where there exist symptoms of effusion, diuretics will be required, and acetate of potash is one peculiarly suitable for children, especially in chronic cases, as it possesses deobstruent qualities, and may thus assist in relieving visceral obstructions, which not unfrequently complicate their chronic affections.

In cases of much irritability, digitalis is a powerful medicine for controlling the frequency of the pulse, influencing the capillary circulation, and increasing the urinary discharge. Its use is therefore indicated in inflammatory affections, attended with serous effusions. It may be given to children under a year, in the dose of one eighth to one fourth of a grain twice a day, or it may be administered in infusion, which is probably the best method of using it.[‡]

The medicine produces a feeling of nausea and languor when the system is under its effects, and when excessive, blindness and vertigo succeed; its operation, therefore, should be carefully watched, and its use suspended for a while, until these untoward symptoms have disappeared. The best antidotes to an over-dose of digitalis are stimulants, a little weak brandy and water, or an infusion of serpentaria, while a blister is applied to the pit of the stomach. For the purpose of more fully directing its effects to the kidneys, a few drops of the syrup of squills may be added to each dose, and ten or fifteen drops of the spirits of nitre may be given in the child's drink every three or four hours.

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[*] ℞ Potassæ Nit., gr. ij.
Pulv. Ipecac., gr. ¼.
Pulv. Doveri, gr. j.
Carb. Sodæ, excic., gr. j. M.
To be given every two hours, in a little barley water.

[†] ℞ Potassæ Nitr., gr. xx.
Hydr. Subm., gr. j.
Antim. Tart., gr. ¼.
Of this, two or three grains may be given every second or third hour.

[‡] Fol. Digital., gr. viij.
Aquæ Ferv., ℥iij.
A teaspoonful may be given to a chil from two to four years, every three hours.

The remarks generally on the subject of pneumonia and bronchitis are applicable to the disease now under consideration, except that but little advantage is to be derived from the employment of expectorants, as might be supposed from the seat of the affection.

CORYZA.

The flow of mucus from the nares, which is known by the names of coryza, gravedo, or snuffles, arises from an inflammation of the mucous membrane lining the nasal fossæ. It is, when protracted, a distressing disease in young infants, as it prevents their sucking; respiration being in a great measure arrested, the child is compelled frequently to stop sucking in order to breathe. It appears under two forms, the simple, which may be either acute or chronic, and the malignant, as described by Drs. Denman and Underwood, agreeing with the pellicular, as it is termed by Billard.

Etiology.—The ordinary cause of inflammation in the pituitary membrane, is that common to all inflammations of the respiratory organs, the application of cold to the surface of the body, either by improper exposure, or from negligence in not changing their clothes when wetted with urine. Another cause is the direct influence of the solar rays and light, when children are first taken out early in the spring for an airing, when unaccustomed to the effects of the sun; hence the popular idea of the unhealthiness of the sun in the month of May, as young children are observed to sneeze often when thus exposed.

Semeiology.—The first symptom of this affection is sneezing, which is soon followed by a secretion of mucus from the nostrils, at first clear. The child being unable to breathe through the nose, as usual, lies with the mouth open when asleep. As the disease advances, the secretion increases in quantity and consistence, and the difficulty of respiration increases in proportion. The discharge, at times, completely closes the nostrils, and prevents sucking, from the impossibility of breathing; he frequently leaves the nipple, manifests fretfulness and distress, while the face becomes purple from obstructed respiration. There is sometimes danger of immediate suffocation when the nostrils are stopped with the secretion, on account of the mouth being also filled with the nipple and milk; under these circumstances, also, the child is in danger of suffering from inanition. This, however, is an extreme case; and in general it is a disease of little danger, although exceedingly annoying to the child.

The malignant variety described by Dr. Denman, is, on the contrary a very serious and fatal disease. It appears to prevail mostly among children of bad habit of body, and is therefore found among those that suffer from defect of nourishment, and who, from breathing an atmosphere filled with impurities, are exposed to all the consequences resulting from these combined causes of deterioration in the fluids.

Cerebral affections are the most ordinary complications of coryza, from the proximity of the inflammation to the brain, and the arrest of the circulation from the obstruction of the respiration; drowsiness often occurs during its progress, and when fatal, frequently terminating in convulsions.

MORBID ANATOMY.—A great degree of tumefaction exists in the nasal mucous membrane, with evidences of severe inflammation, being very red and soft, and the passage filled with thick mucosity. The malignant or pellicular variety exhibits the formation of a pseudo-membranous lining, covering the whole nasal fossæ, and in some instances it is said to have extended back to the fauces, œsophagus and stomach.

TREATMENT.—The treatment must consist of such measures as will allay inflammation: this, however, is often so slight, that it scarcely requires those active agents which are usually employed. The principal source of distress, is the abundant secretion, the existence of which shows that nature is taking the proper course for the relief of the phlogosed membrane. Laxative drinks, made of infusion of prunes, or manna dissolved in milk, by boiling, may be given to a young infant; and in cases with evident febrile excitement, some saline cathartic, or a little calomel may be needed. Where sucking is materially interfered with, from the closure of the nostrils, the child will have to be removed from the breast, and fed with a spoon, until able again to swallow the milk drawn from the nipple. In severe cases it may be requisite to apply a leech at the side of the nose, and a small blister behind each ear.

In the malignant form, the same principles of treatment must be pursued. Dr. Underwood recommends castor oil particularly as a laxative in this disease, observing that debilitated children endure purging under this complaint better than in almost any other; he recommends one or more teaspoonfuls, so as to procure three or four motions daily. As the bowels show great derangement, an attention to them is necessary to a successful treatment of the disease; and much greater benefit is to be derived from removing the acrid secretions and accumulations, than by attempts to neutralize and remove their acrid qualities by absorbents. Antispasmodic enemata should also be given on the appearance of convulsions. Opiates, also, are useful; and the syrup of poppies is an excellent means of calming the nervous irritability, and should be given every night, after the operation of the laxative.

Under this plan of treatment the disease will yield in the course of two or three weeks; but it will be necessary to use some purging medicine after the discharge has stopped. The snuffling will often recur some time after the disease is to appearance cured; it will then be useful to foment the nose with infusion of camomile or elder flowers, and afterward apply some aromatic liniment.*

The removal of the tenacious and acrid secretion from the nose, appears to be a necessary means of cure. After the inflammatory symptoms have subsided, it is recommended, by Billard, to have recourse to some extraordinary measures for its removal, as blowing gently a little fine calomel, or a mixture of sugar and alum finely powdered, into the nostrils; before this, it will be sufficient to remove it gently by means of a soft rag.

CROUP.

This distressing and often fatal disease of childhood, has, within fifty years, received much attention from physicians; a great number of essays, remarkable for the patient and learned investigation they display, having appeared, to illustrate its pathology and nature. From this circumstance, also, various appellations have been given to it, according to the views of the different authors who have directed their attention to the subject. It has, accordingly, been described under the names of asthma infantum, angina suffocativa, suffocatio stridula, morbus strangulatorius, angina membranacea, sive polyposa, tracheitis infantum, laryngo-tracheitis, diphtherite tracheale, etc.; all which names express some of the most prominent symptoms of the disease. The name croup, probably, is the best that can be employed, from its long use, and its adoption in other languages; thereby sufficiently indicating the disease, without being identified with the peculiar speculative opinions of any author, or without taking any one remarkable symptom, occurring in one stage only of the affection, as a type of its nature throughout its entire progress.

Croup is a disease which was formerly singularly fatal; the majority of those attacked with it dying. As its pathology is now better understood, an improvement in its treatment has very sensibly lessened its mortality. Vieusseux states, as the result of his experience, that of twenty cases occurring under his notice in the early part of his practice, (1775), ten died; while at a much later period, the relative mortality was very small, and nearly all were cured;[*] and from the observations of Jurine, made from the closest calculations, the proportion, at the time he wrote, (1812). is stated to have been one in ten. Other statements, made at different places, go to confirm the fact of the improvement in practice, in its adaptation to the nature of the symptoms, and the violence and rapidity of its progress. Michaelis[†] and Bard[‡] state the mortality as in the proportion of two out of three. It must, however, be acknowledged, that there are a variety of circumstances controlling it, which render an exact computation of the proportionate mortality at different periods, a difficult task. Yet there can be no question as to the increased amount of cases that are cured; the majority being now on the side of those who live, the reverse of the result of the cases occurring half a century ago.

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* Treatise on the Diseases of Children, etc., by Michael Underwood, M. D., p. 11

It has been a question with some, whether this disease was known to Hippocrates, Celsus, Galen, and other ancient authors, from the difficulty arising from the infrequency of post-mortem examinations, in enabling us to ascertain whether it was a disease described by them. That it has existed at all periods, and among all people, as the causes have always existed, can not admit of a question. It has been found among the aborigines of our country, prevailing with great severity and fatality.[||] Dr. Coxe, in a learned essay,[§] says, that from the first moment that medicine was cultivated as a science, croup has been the subject of observation; and although not described as a distinct disease, yet records of an affection identical with this disease, are found in the writings of Hippocrates, Rhazes, and Avicenna, and in later times, in those of Platerus, Fabricius, Etmüller, Sylvius, Vigo, Ramazzini, Willis, and others.

Martini Ghisi, of Cremona, gave a clear description of it, as it prevailed very extensively in that place in the early part of the last century.[¶]

It was, however, reserved for Dr. Francis Home, in 1765, to give a full practical account of this disease, and to designate more clearly than had before been done, its distinctive characters. The next in order, and the first American writer, is Dr. Rush, who addressed a letter to Dr. Millar, in London, and giving as his opinion, that croup is always spasmodic. In a subsequent work,[**] he, however, admits his error in regarding croup, in every instance, as a purely spasmodic affection, and that experience had satisfied him of the existence of another form, which, from the presence of mucus in the trachea, he denominated cynanche trachealis humida, and distinct from cynanche trachealis spasmodica.

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[*] Memoire sur le Croup, p. 1.

[†] De Angina Polyposa, etc.: Gœtting. 1778.

[‡] Inquiries into the Nature, etc., of Ang. Suffoc. by Samuel Bard, M. D., 1771.

[||] J. D. Hunter, N. Y. Medical and Surgical Journal, vol. i., p. 311.

[§] American Journal Medical Science, vol. iii.

[¶] Letteræ Medichiæ, 1784.

[**] Medical Inquiries and Observations, 1794.

Dr. Samuel Bard, Professor of Medicine in King's College, New York, published an essay, in 1771, on angina suffocativa, which is clearly the secondary form of croup, occurring after severe inflammatory affections of the fauces and tonsils, and which has, within a few years, been particularly described by Bretonneau and others, under the name of diphtheritis.

A few years after, Dr. Chalmers, of South Carolina, directed his attention to the inflammatory affections of the larnyx and trachea in children, and described with great minuteness, the disease now under consideration.*

In the year 1780, Dr. Middleton, Professor in King's College, in a letter to Dr. Richard Bayley,† made a distinction between genuine croup, and that form which had been known under the name of the sore throat distemper.‡

About the same time, Vieusseux, of Geneva, received the prize of the Royal Society of Paris for the best essay on this subject. From this period there is no disease which has attracted so much the notice of physicians, and on which there has been so much written; receiving from every one a name, designating his peculiar views of its nature. In Great Britain, Germany, France, Russia, and the United States, a great number of monographs have been published; and, as might be supposed, from observations made under the varieties of circumstances arising from difference of climate, mode of living, etc., much diversity of opinion would exist as to its nature and treatment. Most of the cases, also, especially in continental Europe, have been described from those that have terminated fatally. It would, therefore, be difficult to recognise the mild forms or stages of the disease from descriptions taken exclusively from these cases; and thus another cause will be found for the differences of opinion in reference to its nature and treatment.

In addition to the ordinary interest felt by physicians in investigating disease, an additional inducement was offered by the Emperor Napoleon, on the occasion of the death of a son of Louis Bonaparte, king of Holland, in 1807. The prize offered for the best essay, was adjudged to two of seventy-nine that were presented; one to Jurine, of Geneva, and the other to Albers, of Bremen.

There are, therefore, abundant sources of information on the subject of croup, from men of acute observation, rich experience, and philosophic minds. Indeed, on no subject has there been more talent and investigation bestowed; none, perhaps, where they have been followed by more practical results; for the very differences of opinion have arisen, in part, from causes which go more clearly to illustrate the nature of the disease, and the advantages of its practical division into different stages. These remarks apply more particularly to croup, when caused by an inflammation in the mucous membrane of the trachea, or the inflammatory variety; the other, or spasmodic croup, will receive a distinct consideration.

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* An Account of the Weather and Diseases of South Carolina, by Lionel Chalmers, M. D.; London, 1776.

† New York Medical Repository, vol. xiv., p. 347.

‡ For a full account of the early American writers of Croup, see Dr. J. B. Beck's paper in the New York Medical and Physical Journal, vol. i.

Although several able writers, among whom are Bard, Hosack, and Blaud, have expressed an opinion, that there exists no other form of the disease than that arising from inflammation, yet there is unquestionably a variety which arises from a spasmodic affection of the epiglottis; for in some fatal cases no traces of inflammation whatever have been found.* It is not necessary for disordered action or derangement of function to occur, that a state of inflammation should in every case exist; the excitement of the nerves, and the spasmodic contraction of the muscles, independent of inflammation, are evident in galvanic experiments; and simple mechanical pressure will at times produce a derangement of muscular action.

While some have maintained the existence of inflammatory croup as the only form to be met with, others Schenk, Des Essartz, and Lobstein, contend that it never is an inflammatory affection. It is evident, however, that the exclusive views of both are erroneous; yet those who maintain the former opinion are much nearer the truth, for inflammation constitutes the disease in the greatest number of instances.

INFLAMMATORY CROUP.

ETIOLOGY.—The peculiar condition of the system in infancy and childhood, is the most prominent predisposing cause of this affection, for it is rarely found in after life; the instances in which it occurs in adults, are so exceedingly few in number as to be regarded as curious instances of departure from the almost uniform law which appears to control its formation. This predisposition is doubtless in some degree connected with the condition of the larynx, and is probably dependant on the imperfect development of the part, but in what manner it is impossible for us to explain. Dr. Cheyne regards it as arising from this cause, and remarks, that there is scarcely any difference in the size of the opening of the glottis of a child, at the age of three years and at twelve; after the latter period the aperture is suddenly enlarged, and in the male an alteration of voice ensues. The most accurate observers have noticed that it rarely occurs during the first few months after birth, but prevails more among children from the age of two years to five; after the age of twelve it is rarely seen. Boys are more subject to it than girls, according to the experience of Jurine, Albers, and Blaud.*

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* See cases by Mr. Pretty, Lond. Med. and Phys. Journ., vol. iv. Also a case by Mr. Davis, Lond. Med. Rep., vol. xviii.

Children of robust habit and body, and who abound in blood, are, from this circumstance more predisposed to croup, as they are to all inflammatory diseases.

Peculiar districts of country, where there is great variety in the temperature, predispose children much more to this disease than sections where either much cold or dampness prevails, as has been remarked by writers who have noticed closely the effects of different conditions of the atmosphere. Vieusseux says, that the town of Geneva, although not so damp as the borders of the rivers or the bottoms of valleys, is yet more subject to the prevalence of croup, from the sudden changes of the atmosphere, from heat to cold, and from cold to heat.† These remarks are confirmed by observations made in this country by Drs. Rush, Currie, Stearns, and Archer, in their publications on this subject; although Dr. Home and others have stated, that it is particularly confined to maritime situations. I have also remarked the effects of sudden atmospheric vicissitudes, in forming this disease.

Another predisposing cause is to be found in the manner of clothing children with the neck and breast bare. It has been observed, that croup is a very rare disease in Germany, where the custom prevails of clothing the children very carefully, and completely covering the throat with their dress. Dr. Eberle also remarks, that he saw but one case of croup in a number of years, among a large population of Germans, whose manner of clothing leaves no part of the breast or lower part of the neck exposed.‡

This affection, although found at all seasons, more frequently prevails in autumn, winter, and the early part of spring, when a peculiar constitution of atmosphere appears to exist, predisposing to catarrhal diseases; for it is more rife during the existence of epidemic catarrh and hooping cough.

Certain other diseases, principally of an exanthematous nature, as miliary eruption, scarlet fever,|| measles, small pox,§ and thrush,

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* Essai sur le Croup, par G. Fourquet, p. 11.

† Rapp. sur le Croup, p. 77.

‡ Op. Cit., 347.

|| Lec. on the Prac. of Physic, by David Hosack, M. D., p. 514.

§ Cheyne, Op. Cit., p. 39.

appear to impart a predisposition to this disease, as it not unfrequently attacks children laboring under them. Drs. Bard, Rush, and Francis, have observed it as a sequel of malignant sore throat;[*] and Dr. Ferriar also relates two cases which occurred from the same disease.[†]

The most common exciting cause is a sudden exposure to draught of cold air—a current of air blowing on the child, when resting, perhaps, after great fatigue; or by any exposure, whereby the cutaneous transpiration is suppressed, and the aerial passages are excited to undue action, the first stage of inflammation. To these may be added the throwing off of the bed-clothes, so common in young children, and the change of the temperature of a bedroom, toward morning in which fire is usually kept: a sudden check of perspiration necessarily ensuing from these causes.

SEMEIOLOGY.—Croup is usually preceded by the symptoms of catarrh. The child appears weary, fretful, and at times feverish, especially at night; this condition alternating with cold. A teazing cough and coryza attend the formation of the disease. These symptoms may last for some days without exciting any suspicion. At other times the formation of the disease gives scarcely any premonition. Whatever be the manner of the invasion, the incipient stage is one of the greatest importance in reference to the successful treatment; and, accordingly, practical writers have been led to recognise the disease as having three stages, and that it is on the prompt treatment of the disease in its incipient stage that success mainly depends. Guersent,[‡] Blaud,[||] and Hosack,[§] regard the forming stage, the catarrhal symptoms, as one of the most important for the treatment of the disease, and always preceding decided inflammatory symptoms, which are in their turn followed by the exudation, which is the characteristic of the disease. To this view every practical physician will bear his testimony.

The symptoms presented by croup may therefore be divided into three stages, as the most convenient for clearly detailing the succession of symptoms, and as a guide for the proper treatment of the disease.

The first stage is characterized by the affection being purely local, the irritation not extending to the whole system. In some instances the child will be even seen lively and playful. The attack usually comes on at night, and will be easily recognised by the loud breathing, in which the inspiration alone is heard, giving a sound at times resembling the clucking of a fowl, and at other times like the crowing of a young cock. The cough is frequent; of a hoarse, dry, ringing sound. If the child is asleep at the time of the attack, he suddenly awakens, and appears at times to be in great distress, often passing his hand to the throat. There are frequently intervals of relief, in which the child does not breathe with any more difficulty than when in health.

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[*] Bard, Loc. Cit. Francis, Med. and Phys. Journ., vol. iii., p. 56. Med. Inq. and Obs., by B. Rush, M. D., vol. ii., p. 376.

[†] Med. Hist., vol. iii., p. 205.

[‡] Dict. de Méd. et de Chirurg.

[||] Nouvelle Recherche sur la Laryngo-Trachéite, par P. Blaud; Paris, 1824.

[§] Hosack, Op. Cit., p. 515.

In the second stage, the feeling of suffocation increases, the face becomes swollen and red, the surface of the body hot, and the pulse strong and frequent. The tongue is white, and all the symptoms show the existence of increased local inflammation, and general febrile action. The lungs and bronchiæ being loaded with blood, the difficulty of respiration has no interval of relief, while the arrest of the circulation through the lungs produces an apoplectic condition of the brain in plethoric children. The fauces, if examined, do not exhibit any alteration; sometimes, however, the tonsils and velum are a little reddened and tumefied. French writers have recourse to such examination to ascertain the existence of a pellicular deposite over the surface of the fauces, making a diagnosis of the disease; if there should appear a grayish pellicular exudation in plates, the symptoms then do not arise from the existence of primary croup.*

The symptoms are more intense, after renewed attacks of the disease, to which a child is very liable when once affected with it, as it often returns for several successive nights; and if not met by appropriate remedies, the violence of the disease increases, and as it approaches the third stage, or stage of effusion, the cough sometimes excites a retching, when a glairy mucus will be discharged by the efforts to vomit. A momentary relief is then experienced, but the pulse still shows the continuance of febrile action, while the voice remains hoarse.

The application of the stethoscope may be useful in ascertaining the progress of the disease; and during the interval in the stridulous breathing produced by vomiting, the loud mucous ronchus may be distinctly heard. The sibilant ronchus will also be distinguished as the disease advances, while percussion gives a dull sound in every part of the chest.

The third stage is characterized by effusion into the trachea, bronchiæ, and on the surface of the lungs; which in the trachea assumes a membranous appearance. When these symptoms arise, the intensity of the cough and labor of respiration increase to a distressing degree, and its whistling sound may be heard at a great distance. The face is high colored and much swelled, the eyes are prominent and suffused, and the carotids beat with great force. The tongue is white, and the mouth dry; the child drinking with great eagerness. The disease continuing its progress, the sense of immediate suffocation is so intense, that every position is instinctively sought for relief; but the head is for the most part thrown backward, whereby the trachea is extended, and its capacity increased; the child struggles violently to free itself from restraint, and if old enough, will attempt to get upon its feet. The matter vomited, either spontaneously or by means of art, consists of thick mucus, or portions of a white membranous substance, which forms the false membrane lining the trachea. There is occasional relief from the most violent symptoms, but of very short duration. The distress and labor of respiration increase; the cough becomes more hoarse; the voice is almost a whisper. The child struggles more violently than ever for breath; the pulse intermits, a cold sweat covers the body, the limbs are cold and swollen, and the circulation is evidently fast failing. As death approaches the cough ceases, but the suffocation increases; and coma or convulsions close a scene of the most appalling distress that the physician is ever called to witness.

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* Fourquet, Op. Cit., p. 4.

Such is the usual progress of the disease when fatal. There are, however, other circumstances attending it, which deserve the attention of the physician. These are the remissions which are noticed during its progress, varying from some hours to several days, which has led some authors to regard the existence of an intermittent croup. This opinion, however, can not be maintained, any farther than that the disease will remit, at very uncertain intervals. The relief is often very great, especially after free vomiting; and the child falls into a quiet sleep, without giving the least evidence of the existence of the disease, suddenly, however, awaking with an attack more severe than the former.

It not unfrequently happens that children, after a severe attack of croup, will recover their strength and appetite, and are to appearance restored to health, leaving the parents free from any apprehension of danger; but a relapse will sometimes very suddenly take place after an interval of greater or less duration, much more violent than the former one, and is often quickly fatal. The physician should therefore be guarded in his prognosis, and not pronounce a child to be restored, until the evidences of an entire relief from all the symptoms are placed, if possible, beyond a doubt. M. Desruelles* is of opinion, that it is not until after seven days have passed that the patient ought to be pronounced free from the danger of the return of paroxysms of croup.

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* Traité sur le Croup, etc.; Paris, 1822.

Without being so particular as to designate the exact time, the prognosis may be made with tolerable correctness, by noticing clearly the usual appearances which denote a return of health. If expectoration be free, discharges from the bowels copious, urine abundant and depositing a sediment, while the skin is soft and moist, and the child free from any morbid exhilaration, the remission may be pronounced to be a favorable one.

It is not difficult, when these three stages of the disease are taken into consideration, to estimate the danger to which the child is exposed. In the first stage, when the disease is purely local, and only accompanied by cough, without laborious respiration, there is little danger to be apprehended; but when the respiration becomes laborious, and gives the peculiar sound of croup, a sound as if the air was passing through a narrow tube, with the cluck or crowing so remarkable in this disease, it is evident that the larynx is severely inflamed and tumefied, and if not promptly relieved, will rapidly pass to the third stage, or stage of effusion, which is so almost certainly fatal, as to have been denominated the fatal stage of croup.

Morbid Anatomy and Pathology.—Dissections exhibit all the signs of active inflammation in the trachea and bronchiæ; the mucous membrane is found red, and covered with an exudation, which is of a tubular form and solid in the trachea, and fluid and albuminous in the bronchiæ; the last-mentioned secretion differing from the former only in its consistency. Besides inflammation in these parts, it also appears, at times, over the whole mucous membrane of the lungs, and fluid is even found filling the cavities of these organs. In severe and protracted cases, serum has been seen effused in the cavity of the pleura. In cases of long standing, the lungs have been found hepatized. The morbid products of the inflammation are in proportion to the progress of the disease, and are very abundant if the child has for a long time resisted the invasion of death. The pseudo membrane is generally detached from the mucous surface, from which it is separated by a recently exuded viscous matter; it also preserves the form of the air-tubes, forming a species of cord.*

In those cases which are suddenly fatal, after a disappearance of the violent symptoms, a closure of the trachea takes place, from a partial detachment of the membrane forming a sort of valve, which closes the passage to the lungs, as remarked by Dr. Cheyne. In some instances extensive inflammation has been found in the air-passages, on a post-mortem examination, without any appearance of an adventitious membrane.† In such instances, the peculiar symptoms of croup are doubtless produced by the tumefaction of the glottis and adjacent parts; for the passage to the larynx is so exceedingly small in a child, that a slight swelling of the mucous membrane of this part will nearly close the passage, and produce the characteristic inspirations of croup.

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* Fourquet, Case ii., p. 20.

† Dr. Francis's Essay in N. Y. Med. and Physical Jour., vol. iii., p. 56, and Dr. Jackson's Cases, N. E. Jour., vol. i., p. 385.

A remarkable illustration of the instantaneous effect of the altered state of the mucous membrane of the glottis, occurred in my practice a few years since, in the case of a child that swallowed, or attempted to swallow, some sulphuric acid that was standing in a cup, which a servant was using to clean brass, the child mistaking it for water. The respiration had the peculiar sound of the breathing in croup, and could be heard a considerable distance.

With regard to the chemical composition of the false membrane of croup, it is composed, according to the experiments of Schwilgué, Desruelles, Bretonneau, and others, principally of albumen, and is nearly the same as mucus, the buff of the blood, or the epidermis. According to the opinion of Lélut, it appears to arise from the mucus secreted by the inflamed part rendered more rich in fibrin by the inflammatory condition, from the chemical analysis of all these substances having so great a resemblance. Dr. Hosack is of opinion that the membrane arises merely from the rapid passage of air through the trachea.

From the symptoms and post-mortem appearances of the disease, there can be no question as to its inflammatory character; and the nature of its pathology may be suspected from the causes, even before the symptoms have arrived at that stage which gives unerring evidences of its character. The symptoms are, from the beginning, those of violent inflammation: the local pain attended with febrile excitement, and the augmentation of the secretions in the air passages, clearly point out the exalted action of the sanguineous system. These are confirmed by post-mortem examination. The parts affected may be either the larynx alone, or the trachea, bronchiæ, and substance of the lungs themselves; for it is evident that it is not confined exclusively to the larynx, as was maintained by Desruelles.

When the causes of croup are considered, it is evident that it admits of a division into two forms, the one arising from an original or primary affection of the air-passages, and the other as a consecutive effect of disease in adjacent parts. The division, therefore, made by Dr. Stokes,* of primary and secondary croup, is a very judicious and highly practical distinction.

Primary croup is a disease of an active inflammatory nature, sporadic and endemic. In this form the exudation first commences within the trachea, and spreads upward, and is, in most cases preceded by symptoms of catarrh. The secondary croup is the diphtherite of Bretonneau,* and, as we have already seen in the symptoms above described, is connected with an affection of the pharynx, as in scarlet fever, malignant sore throat, etc.; the exudation proceeding from above downward, while the ability to swallow is almost always lost. The last-mentioned writer asserts, that inflammation of the pharynx always precedes croup. It is an epidemic disease, and exists without being preceded by catarrh. By keeping this distinction in mind, important practical benefits will arise in the treatment, and the conflicting statements of different writers will in some degree be reconciled. This secondary affection has also been observed by Mr. Pretty, as following scarlet fever and malignant sore throat;† and there can be no question as to the great practical utility of the division just stated.

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* Treatise on the Diag. and Treat. of the Diseases of the Chest, by William Stokes, M. D., M. R. I. A.; Dublin, 1837.

From the pathological condition of the larynx and trachea, in different instances, M. Blaud‡ makes three modifications of the disease, depending on the violence of the inflammation, and manifested by the nature of the secretion from the inflamed mucous surface. In the worst cases, laryngo-tracheitis exhibits itself with the most violent symptoms, succeeding each other with great rapidity, and almost always fatal. In this variety the secretion consists of a false membrane of different degrees of thickness, covering either the whole or a portion of the surface of the affected part. Another form, less severe in its progress, is often favorable in its termination; in this, the secretion is opaque and puriform. In the mildest variety there is little inflammation; it quickly disappears without the interference of art, while the mucous secretion is thin, limpid, and frothy.

This would appear to be a very unnecessary division of the subject, as there is every shade of inflammation insensibly passing into each other, and the prognosis and treatment will depend entirely on the extent and violence of this inflammation. When this is light, it will yield to but little treatment, and will easily be recognised by the secretion not assuming the membraniform appearance. It often gives evidence of no other disease than the existence of a catarrhal affection, of greater or less extent; and in proportion to the violence of inflammatory action, will it need the active interference of the physician for its removal.

The cough, or the peculiar sound so remarkable in expiration in croup, is observed to exhibit two kinds of sound. The first, acute, from the active spasmodic contraction of the muscles of the larynx, excited at first by the column of expired air; the grave, which succeeds it, from the forced enlargement of the glottis, by the shock of the same column of air overcoming the contraction of the muscles. A prognosis may therefore be made from this fact; for in proportion to the acuteness of the sound is the violence of the disease: when, on the contrary, the more grave the sound, the easier the muscles yield to the force of the expired air, affording an evidence of the lightness of the affection, which is in proportion to the graveness of the sound.*

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* Des Inflam. Speciales du Tissu Muqueux, etc., par P. Bretonneau.

† Lond. Med. and Phys. Journal, January, 1825.

‡ Op. Cit., p. 18, et seq.

The difficulty of respiration, also, must arise in part from the same cause impeding the passage of air to the lungs, and in part from the thickening of the mucous membrane covering the opening of the glottis, and the presence of the secretion, both in the larynx, trachea, and bronchiæ; and it is evident that death must ensue from the obstruction of the air-passages, and the clogging of the air-cells, by which atmospheric air is excluded from the lungs.

TREATMENT.—The first, or forming stage of the disease, is the period when the strongest impression can be made, and the progress of the affection at once arrested. The practical advantage of recognising different stages in the inflammation, although the line of demarcation may be indistinct, is obvious, when the importance of decisive measures is considered, and that the successful treatment of croup altogether depends on the adaptation of remedies to the existing state of the inflammation, on which the train of frightful symptoms in croup depends. It is on this account that the arbitrary division becomes important; and although it is not in our power to mark precisely the transition from one condition to the other with exactness, yet it can be easily seen by the observant physician, when the period of purely local excitement—the period requiring only the use of such remedies as will restore to the affected membrane its normal function of secretion—is passed, and when the necessity for speedily adopting measures to relieve the intense inflammation, and the febrile disturbance accompanying it, exists. To prevent the establishment of decided and active inflammation, and to remove it, when it is established, by the most prompt and energetic treatment, is the only effectual way of preventing its proceeding to the last stage, or that in which the disease is so often fatal.

The attempts, therefore, to cure this most terrible of all diseases, should, if possible, be made when it is in its incipiency; and when this opportunity is afforded, we never need fear the result. To restore a healthy action and secretion to the affected part, an emetic will be found the most efficient, and, indeed, the only means for effecting it at once; the disease having frequently been promptly arrested in its progress by this remedy. Tartar emetic, as a general rule, is to be preferred to any other article for accomplishing this object, but the employment of any emetic substances ought to have reference to the particular case; and if the child be very young, or of a debilitated constitution, the use of tartar emetic may be attended with some risk, from the prostration of the vital powers which it produces. It had better be combined with ipecacuanha, and administered in a dose sufficiently large to produce full, free vomiting, in the proportion of a grain of the former to ten or fifteen of the latter, to a robust child two or three years old. The advantage of a judicious combination of other emetic substances, which also appear to excite an action in the mucous membrane of the air-passages, different from the diseased action, is apparent in the use of squills in connexion with it, or of the compound syrup of squills, where, from the tender age of the child, or from a feeble constitution, the use of tartar emetic is to be feared. These are matters not to be disregarded. Having known of utter and irremediable prostration, and death quickly ensuing, from the use of tartar emetic in young children, I have, since these unfortunate cases, been particularly guarded in its use. If the child has arrived at the age of two years, and possesses an ordinary amount of vigor, and, especially, if the disease appear to be rapidly advancing to that stage in which the whole sanguineous system participates in the abnormal changes above mentioned, a combination of tartar emetic and ipecacuanha may safely be used, and is powerfully efficacious in averting the development of febrile action, from its effects in augmenting the secretions from the liver, pancreas, kidneys, skin, and intestines. It should be repeated every ten or fifteen minutes, until free vomiting is produced. A large quantity of tenacious mucus will be discharged; and from the altered sound of the cough, it will be seen that the natural secretion has been restored to the part; and if the functions of the skin are also restored, the patient may be considered for a time free from danger.

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* Op. Cit., p. 352.

Where there is reason to apprehend excessive prostration from the use of tartar emetic, either alone or combined with ipecacuanha, it may be administered in conjunction with oxymel of squills;* or ipecacuanha, either in a powder or syrup, may with safety be given to the youngest infant; and there is but little hazard in an excessive dose of this medicine. It may be given to the youngest infant, in doses of half a grain to a grain, with sugar, every fifteen minutes, or

* ℞ Oxymel. Scillæ, ʒj.
Vini Antimonii, ℥ss. M.
A teaspoonful every fifteen minutes, until vomiting is produced.

half a teaspoonful of the syrup. After a year old it may be doubled, and given with greater frequency.

However efficient the operation of these emetics may be, and how much soever the patient may be relieved, it still behooves the medical attendant to be prepared for a return of the disease; for it will often recur at intermediate intervals, and, upon the slightest reappearance of the symptoms, should be promptly met by the same means. The bowels ought, at the same time, to be moved by a full dose of calomel, aided in its operation by castor oil or enemata. From five to ten grains may be given for this purpose, if the effects of the emetic substances have not extended to the bowels. The main dependance, it must be recollected, is upon the free and full operation of emetics; and such are the powerful effects of this class of remedies in arresting the progress of the disease, that practical men in every country regard them as the principal resource in the forming stage of croup.

If febrile symptoms show themselves, or if, on the first arrival of the physician, there appear to exist undoubted evidences of inflammation, no time should be lost, but blood must be drawn freely, in proportion to the age and vigor of the child: from two to four ounces for a child under two years, and from four to six ounces for one five or six years of age. As in the incipient stage of the complaint the prompt administration of an emetic is our best resource, so on the formation of the disease, and the establishment of inflammation, our principal reliance must be on decisive and efficient blood-letting. No time should be lost in attempts to relieve the child by emetics, or any other means, to the neglect of bleeding. The relief procured by the loss of blood is often immediate, and if followed by other appropriate measures, is not unfrequently permanent. It more often happens that the urgent symptoms return, on the return of reaction, again demanding the operation of bleeding, which is almost with certainty followed by a mitigation of the disease. The extent to which bleeding is to be carried, must depend upon the sound judgment of the physician on the case under treatment; yet it is not to be questioned that it has been carried to too great an extent; and in no instance ought the child be bled to syncope, as recommended by Bayley,* Ferriar,† Dick,‡ Chapman,‖ and others. Dr. Eberle urges bleeding, as far as it can with safety be practised, when he recommends the patient to be bled in a sitting posture, with his feet immersed in warm water, until partial syncope be produced. He limits such copious bleeding to cases of the most violent inflammatory action, indicated by an active, firm, tense pulse, and a general fever.* Dr. Hosack, although an advocate for large bleedings in croup, does not approve of their being carried to such an extent as to produce fainting, having observed in several instances very serious and permanent evils arise from the excessive loss of blood. This opinion is sustained by my experience; and although prompt, decisive, and repeated bleeding is necessary, yet the constitution will often suffer from the loss of blood, carried to the extent insisted on by many writers, where the nervous system feels the effects of this remedy, as at this early age; its conseqences continuing for a long time after. There is nothing more difficult in medicine than the practical application of general principles; and the judicious practitioner will always proportion the remedy to the circumstances of the case before him, and especially in the abstraction of blood, keep in view, in addition to the object to be attained, its effects on the system generally, and its ultimate consequences; and while the urgency of the symptoms and the fatal tendency of the disease are considered, the age and constitution of the patient, and the period of the disease, must also be weighed; for, in addition to the vigor of the patient, there is a period in which bleeding would be decidedly hazardous, although the most prominent symptoms of the disease continue unsubdued; that period when nothing more than the effect of inflammation, the exudation of lymph, exists —a period characterized by the loss of vital force, contra-indicating the use of blood-letting in any form.

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* Letter to W. Hunter.

† Med. Hist., vol. iii., p, 207.

‡ Supplement to Dr. Barton's Med. and Phys. Journal, May, 1809, p. 242.

‖ Phil. Journal Med. and Phys. Science, vol. i., p. 303.

This leads me to consider the custom of local bleeding in croup, during the period of active inflammation, so common in continental Europe; some practitioners depending altogether on this method of treating the disease. There are others, however, in France,† who recommend general blood-letting, as decidedly preferable to local depletion by leeches, but advise their use, should it be necessary to have recourse to the loss of blood a second time.

Practitioners in this country rely but little on the effect of leeches to the throat. Dr. Dewees, indeed, is opposed to their use altogether, under any circumstances, never having seen them productive of any benefit; but on the contrary, from the length of time necessary to obtain the requisite quantity of blood, the exposure of the throat during their application, and the coldness of the leeches, the symptoms of croup have increased during their application.‡ Another objection has been made to their use, arising from the difficulty of stopping the flow of blood from the part covering the larynx. It is, indeed, a serious one, and one which ought always to be considered when applying leeches to the throat, especially in children. To obviate any difficulty from this cause, it has been proposed to apply them immediately above the upper extremity of the sternum; and, as it may doubtless at times occur that blood should be drawn from near the inflamed part, they may be with advantage applied in this situation. Dr. Dewees recommends cups, where it is necessary to use local depletion, applied between the shoulders, but never around the throat.

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* Op. Cit., p. 357.

† Fourquet, Op. Cit., p. 42.

‡ Treatise on the Physical and Medical Treatment of Children, by William P. Dewees, M. D.; Philad., 1826, p. 441.

It is, indeed, seldom necessary to have recourse to local bleeding; for after a strong impression has been made on the circulatory system, the circulation can often be sufficiently controlled by other remedies, and by efforts made to excite the action of the secretory system, thereby preserving an equilibrium, a means, when properly used, as powerful in the relief of inflammation, as the abstraction of blood.

Dr. Cheyne and other writers advise drawing blood from the jugular vein; but from the impossibility of ascertaining the quantity thus taken, arising from the constant restlessness and coughing of the child, and the difficulty of closing the vein for the same reason, it should seldom if ever be attempted; a sufficient quantity of blood being always to be obtained from the arm of the youngest child, with a little practice in the efforts to bring the vein near the integuments, by pressing the cellular substance with the finger from around it after the bandage has been applied. I have rarely been foiled in bleeding a child, if sufficient time has been taken to press the part immediately over the spot where the vein lies with the moistened finger. A vein on the back of the hand, or on the foot, may also often be found, after having immersed the limb in warm water.

Immediately after bleeding an emetic ought to be administered, if the symptoms are not decidedly improved; and that no time be lost, a decided advantage will be obtained by combining it with a cathartic, that the whole secretory functions of the stomach and abdominal viscera may be excited into action.* If the physician has seen the case from the commencement, and administered such remedies as will act on the intestines, it may perhaps be unnecessary to repeat the cathartic immediately, if the progress of the disease has been rapid. But, as is most frequently the case, he for the first time sees the case during the period of active inflammation, when, in addition to the local affection, the entire circulatory system participates, it becomes his duty promptly to use all the means in his power for the arrest of this truly frightful disease. The action of an emetico-cathartic is a powerful adjunct to bleeding, when the symptoms are not relieved by this operation; the nausea, together with the vomiting, and the discharge of biliary and intestinal fluids, have a powerful influence on inflammatory action. These active measures, however, are not admissible in every case; the violence of the inflammation, and the ability of the child to bear the evacuations, must be in all cases taken into consideration.

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* ℞ Hydr. Subm., gr. xx.
Antim. Tart., ℈ j.
Divid. in Pulv., No. iv. M.

For a child three or four years old, one powder to be given every fifteen minutes, until vomiting ensue.

The great efficacy of calomel in croup has induced some practitioners to rely almost exclusively on its use in the treatment of the disease; and it is to American physicians that the profession is indebted for the mercurial treatment of croup. Dr. Rush considered it as the main resource in managing a case of croup, and as certain a remedy as the Peruvian bark in intermittent fever.* Dr. Kuhn was in the habit of giving five or six grains of calomel, three or four times a day, to a child of two years. Dr. Redmond prescribed it in doses of three grains every three hours, until fifteen grains were taken, to the youngest and most delicate infants. Dr. Hosack also gave it in doses of five to ten grains every two hours, until a decidedly cathartic effect was produced; and if the bleeding, emetics, and cathartic, failed to subdue the febrile symptoms, and divert the irritation from the trachea and lungs, he combined it with James's powder, from two to five grains each, every two hours, to a child under four years, until a sufficient evacuation from the bowels was produced. Dr. Hamilton, of Edinburgh, considered calomel as one of the most powerful remedies in croup, and has succeeded in curing it under the most unpromising circumstances; but remarks, that no relief whatever can be obtained from it, unless given in very large doses. He gave it to the extent of one hundred and thirty-three grains in sixty hours,† to a child of seven years. This certainly is an enormous quantity, but not equal to that taken by a child of two years, to whom, under desperate circumstances, he gave one hundred grains in twenty-four hours.‡

To an extent like this no prudent practitioner can bring himself to prescribe calomel in croup, where the intestinal mucous surface is fully exposed to its action; unlike the condition in some other diseases, where a coating of thick mucus prevents the immediate contact of the remedial agent, as is sometimes found to be the case in scarlet fever.

Dr. Stearns, of New York, relies principally on the use of calomel, combined with the cerated glass of antimony, in the treatment of the disease, to the entire exclusion of blood-letting; regarding the disease as arising from a torpor in the absorbents of the trachea, and not as an inflammatory disease. He gives twenty grains of calomel, combined with eight grains of cerated glass of antimony, to a child one year old, when the symptoms have assumed a violent character, with a proportionate increase for older children, repeated every eight hours. One dose, he observes, is generally sufficient, and he has never had occasion to administer more than four. In connexion with this he gives a decoction of polygala senega, as an expectorant.*

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* Rush's Inquiries, vol. ii., p. 378.

† Use and Abuse of Mercury, by John Hamilton, M. D..; Edin. 1809.

‡ Chapman on Croup, Phil. Jour. Med. Scien., vol. i., p. 308.

No doubt can exist as to the salutary influence of calomel in this disease, from its agency in exciting the secretory functions generally. It is unquestionably an active expectorant, especially when combined with other remedies which exercise an action on the bronchial mucous surface.

The warm bath, from 92° to 98°, is an exceedingly useful adjunct to other measures in the treatment of this disease, particularly in the early periods. It has a peculiarly exciting effect on the capillaries of the skin, producing an action in its exhalent function; the internal tissues are thereby relieved from their superabundant supply of fluids, and the local internal congestion and inflammation are met by a most powerful remedy.

Blisters are important remedies in this disease; and if the symptoms are not materially relieved by the means already suggested, and the state of the pulse evidently affected, one should immediately be placed over the throat covering the larynx and trachea. Some recommend the blister to be applied to the neck, between the shoulders; others on the arms, or on the upper portion of the chest. In a disease of so rapid a progress as the croup, but little advantage can be derived from the application of a blister in a part remote from the seat of the disease; and if an impression has been made on the circulation by the course already pursued, the blister should be applied directly over the affected part, which is first to be well irritated by warm turpentine; it will very copiously deplete from the capillaries of the part, and aid in fulfilling the general indication.

Rubefacients, however, where the disease is evidently arrested in its progress, will often be all the external revulsive required. They may consist of a sinapism, or an embrocation of equal parts of tincture of capsicum and tincture of Spanish flies, or warm spirits of turpentine. The last-mentioned articles may be applied by friction over the throat, and a flannel moistened with them then put around the neck. In all affections where the respiratory organs are concerned, liniments made of ammonia ought carefully to be avoided, from the stimulating effects of the volatile part of the liniment on the diseased mucous membrane.

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* Coxe's Med. Museum, vol. v., p. 195.

It very often happens, especially if the remedies above mentioned have been promptly and diligently employed, that the disease is relieved without manifesting the invasion of the third or membranous stage. Yet, from the deceitful nature of the intervals of respite, it is the duty of the physician to be carefully guarded in his prognosis, and to employ such remedies as experience has instructed, as will best preserve the secretory functions of the tracheal mucous membrane in its normal condition, while other means are used to maintain the circulation in its equalized state.

For effecting the first mentioned object then, the expectorants already mentioned, page 45, may be used; or perhaps there is nothing better than a combination of syrup of squills and antimony, or a few drops of the compound syrup of squills, every two or three hours. These expectorants have been found exceedingly valuable after the active inflammatory symptoms have subsided; and when combined with antimony, their stimulating effects, so much dreaded by some physicians, are very materially controlled, while their expectorating qualities are sensibly increased. The physician should carefully watch the progress of the affection, and there will be but little danger of erring, by prescribing a stimulating expectorant. It even happens that a temporary debility will exist after active inflammation in a part, bordering on paralysis, and where a slight stimulating medicine will be needed to prevent a relapse of the disease; in such a case, squills or senega may be advantageously used, and, as above suggested, may in some cases be united with antimony.[*] Dr. Archer, of Maryland, was the first who introduced the polygala senega into practice as a remedy for croup; and where the violence of the inflammation has been subdued, it is unquestionably the best that can be employed where the croupy cough continues, as it often does for a number of days: or where it has assumed a chronic form, no other remedy possesses so great a control as this over these protracted symptoms. Where the addition of antimony is not necessary, as it forms an ingredient in the compound syrup made of senega, it may be given in decoction, made by boiling an ounce of the root in a pint of water, down to three gills, and with the addition of two ounces of honey, in the dose of two or three teaspoonfuls every hour or two, to a child three or four years of age.

[*] ℞ Syrup, Scillæ, ℥j.
Syrup. Tolu.,
Vin. Antimonii, āā ℥ss. M.
Eight to ten drops once in two hours, to a child of a year old.

℞ Decoct. Senegæ, ℥ij.
Oxymel. Scillæ, ʒij.
Syrup. Ipecac., ʒj.
Antim. Tart., gr. ss. M.
A teaspoonful every two or three hours, for a child two years old.

To fulfil the second indication, great care should be taken to preserve a suitable warmth to the surface, by proper clothing of flannel, frequent bathing of the feet in warm water, and by carefully guarding the child from any sudden exposure to a draught of cold air. Rubefacient applications, also, ought frequently to be applied to the chest.

The third stage of croup is characterized by the formation of a membrane in the trachea, or of a quantity of purulent lymph, extending even to the minute ramifications of the bronchiæ, as far as the anatomist can trace it. In this stage the breathing still continues laborious, with an increasing cough, and which gives not the slightest relief by expectoration, while suffocation appears every moment about to close a scene of indescribable suffering. Here the treatment must be to remove the membranous exudation and lymph which obstruct the air passages, and, if possible, to restore and maintain a healthy secretion in the inflamed part.

As in the former stages emetics were among the most important remedies, so in this, also, they have been found the most valuable resource, indeed, almost the only one on which we can depend, being restricted also in the class from which they are taken. Those of a stimulating character are here indicated, as the mucous membrane of the trachea and bronchiæ have passed beyond the period of preternatural excitement. Among these the polygala senega stands foremost, and may be given according to the directions of Dr. Archer. He prescribes it in decoction, made by infusing half an ounce of the bruised root in half a pint of boiling water, which is simmered down to four ounces; of this a teaspoonful is to be given every half hour or hour, according to the violence of the symptoms, with a few drops given at intervals, to keep up an action on the fauces, until it can produce an emetic and cathartic effect; after which, a small quantity is to be frequently given, to preserve a continued stimulating effect on the mouth and fauces. The powder, also, has been used with equal advantage, in doses of four or five grains, mixed with a little water.* By means of the polygala the twofold advantage will be obtained, of procuring an evacuation of the morbid secretion, and exciting the mucous surface to a new and altered action. Where it appears to affect the bowels alone, a few drops of laudanum may be combined with it, and will sufficiently restrain any tendency to pass off in this manner.

Among the remedies which have been successfully used for the expulsion of the membranous formation, under circumstances which afford but little reasonable hope for recovery, are vitriolic emetics. The sulphate of zinc and sulphate of copper have been resorted to, when scarcely any expectation of relief could be indulged. The former has been used by Dr. J. W. Francis, of New York, in three cases, with complete success, where all hopes of recovery had been previously abandoned.* A strong solution, consisting of two drachms of sulphate of zinc to an ounce of water, was made, of which a large teaspoonful was administered every twenty minutes to a child of two years, for about two hours, without effect. A solution of sulphate of copper, of the same strength, was prepared, and after twice giving it, a portion of the membrane was detached; the white vitriol was then again resorted to, with the effect of dislodging a large quantity of similar membranous substance. Dr. Francis, to whom the profession is indebted for the introduction of this remedy, remarks, that vitriolic emetics may be given with more safety than is generally supposed, in those cases where inflammatory action has been subdued. Sulphate of copper alone, and combined with calomel, has recently been introduced into practice in Germany, in epidemic or secondary croup, which will be considered below.

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* Treatise on Croup, by G. Archer; Philad., 1798, p. 33.

The membrane has sometimes been expelled spontaneously in violent fits of coughing, and at other times been removed by the introduction of some chemical or mechanical irritant to the upper part of the œsophagus, and even within the opening of the glottis itself. Desault and Depuytren† had recourse to these means; and with the assistance of a piece of fine sponge, moistened and fixed on the end of a small slip of whalebone, introduced irritating substances into the opening of the glottis. These are, however, hazardous experiments, and have scarcely ever been attended with success. M. Billard mentions the almost instantaneous death of a child on the application of powdered alum to the glottis.‡

Although the membrane has been removed, yet recovery has not in every instance followed. This should be always kept in mind, for recovery is generally expected where this result has followed the powerful means used for its expulsion. Several writers, Michaelis, Dewees, Cheyne, and others, record instances in which the membrane has been completely discharged, and death ensued. This, however, should not deter the physician from using all the means in his power for its prompt and effectual removal.

This naturally leads to the consideration of the operation of tracheotomy, which has been proposed both for the purpose of expelling the membrane, and affording a longer time for the performance of respiration; a brief notice of which it may be proper to give, that the whole subject of the treatment of croup may be duly considered.

When all measures of a strictly medical nature have failed to produce a relief of the urgent symptoms in the last stage of croup, it was proposed, a long time since, by Home and Michaelis, to have recourse to surgical means, as the only thing left to be done, and where death appears to be the certain termination of the disease. It is indeed a desperate resource, and one which has not received the sanction of many eminent men, either in Europe or in this country, having produced the wished-for result in but few instances. It has been tried in Spain, Denmark, several parts of Germany, in Geneva, Brest, Lyons, and Paris.* In our own country it was also attempted by Dr. Physic† in two instances, both of which were unsuccessful. The principal objections to the operation are, that it is not certain to remove all the causes of the obstruction to the respiration, for the tenacious mucus often exists below the opening; neither will it prevent the disposition of the part from forming new depositions of membranous matter.

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* New York Medical and Physical Journal, vol. iii., p. 54.

† Guersent, Dict. de Méd.

‡ Op. Cit., p. 388.

Within a few years past the attention of physicians has been directed again to the subject; and that it may in some desperate cases be successful, appears from the result of the dissections of M. Bretonneau, in primary and secondary croup. In fifty-five cases, examined by him at different ages, there were six or seven where the membraniform matter reached to the ultimate ramifications of the bronchiæ. In one third of the whole number, it extended as far as the bifurcation; and in the remaining number, thirty or thirty-one, it terminated at different parts of the trachea. It may, therefore, be successful in those cases where it is confined to the upper part of the trachea and larynx, by maintaining respiration until the process of the deposition of lymph has ceased; in the other instances it must be evidently of no manner of utility as a means of cure. To decide as to the precise seat of the affection during life, and thereby be guided in our opinion as to the necessity of the operation, must be admitted by all to be a matter of the greatest difficulty, if not of utter impossibility, notwithstanding the opinions of some to the contrary. M. Fourquet,‡ who strongly advocates the use of tracheotomy, records the successful operations of M. Bretonneau, in five cases out of seventeen, and of M. Trosseau, in six out of twenty-one; five of which occurred in the last eleven, on whom tracheotomy was performed. Since the publication of M. Fourquet's essay, in 1834, the results of one hundred and forty cases operated on, have been reported to the Royal Academy of Medicine at Paris, which probably include those just mentioned; twenty-eight of which were cured, and the remaining one hundred and twelve died.‖ They were doubtless cases partaking more of the character of laryngitis than croup.

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* Royer-Collard, Dict. des Sc. Méd., tom. viii., p. 417.

† Dewees, Op. Cit., p. 447.

‡ Op. Cit., p. 57, et seq.

‖ Journ. des Connais. de Méd., June, 1837.

When a child has once had an attack of croup, it will be very liable, on the slightest exposure to cold, to have a return; every proper means ought, therefore, to be had recourse to by the parents, on the appearance of a slight cough, to prevent, at an early period, the full formation of the disease. When the child becomes hoarse, all stimulants must be withdrawn, and the patient confined to an apartment of agreeable warmth, and immersed in a tepid bath, and a drachm of the subjoined mixture given every hour; or every two hours, if it produce vomiting.[*] At the same time the child should be gradually accustomed to the vicissitudes of the atmosphere, while the body is well clothed, and especially the neck and throat well covered.

These remarks apply more particularly to the primary form of croup. It remains now to consider that variety of the disease which arises as an effect or a consequence of inflammation existing primarily in the fauces and tonsils, and spreading thence to the air-passages; a distinction which some writers appear not to have noticed with sufficient care, but which will not be regarded as useless, as a modification of treatment will necessarily arise, from the difference in its nature.

When speaking of the causes of croup, it was remarked that the pre-existence of other affections, known generally under the name of anginose diseases, was occasionally productive of the symptoms of croup, not unfrequently terminating in that disease in its most aggravated form; and it is unquestionably this secondary form which the late Dr. Samuel Bard described under the name of angina suffocativa, occurring after cynanche maligna. Dr. M'Kenzie, professor of anatomy at Glasgow, has also described this form of croup as frequently commencing on the surface of the tonsils, and spreading thence along the arch of the palate, coating the superior surface of the velum palati, and at last descending to the internal surface of the larynx and trachea.[†] M. Bretonneau has more particularly described it under the name of angina pellicularis; and from the identity of diphtheritis and the malignant sore throat, it is doubtless the same affection which was a number of years before described by Dr. Bard. It was also remarked that several eminent men have recorded the fact of its appearance as an effect of scarlet fever, small-pox, measles, etc. We may therefore be prepared to find it prevailing as an epidemic disease, and observing the same laws as to its development and extension as the diseases just mentioned. It existed in this manner in the year 1827, in France, and was characterized by coryza and inflammation of the tonsils, followed by an exudation, which spread to the respiratory passages. Post-mortem examinations discovered a false membrane covering the membrane lining the nostrils, tonsils, œsophagus, glottis, larynx, and trachea, from two or three lines in thickness.[*]

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[*] ℞ Vin. Ipecac., ℥ss.
Syrup. Tolu.,
Mucilag. G. Acaciæ, āā ℥j. M.

[†] Ed. Med. and Surg. Journal, April, 1825. Med. Chirurg. Review, June, 1827.

In the treatment of the secondary form of croup, regard must be had to the nature of the primary affection. Nothing can warrant the employment of active depletion in any case for the relief of the urgent symptoms of croup, as these always arise in the latter stage of the affection; the depletory measures must be resorted to early in the disease, before the characteristic signs of croup have appeared.

Topical applications, of a stimulating and escharotic nature, have been the measures principally used in its treatment, applied to the fauces and tonsils. The method of treating anginose affections with topical applications is by no means modern, for Areteus appears to have used them, although it is somewhat doubtful whether he was acquainted with croup. He applied alum in gangrenous affections of the throat, probably under precisely the same circumstances as it has of late been used by those who have so particularly described the disease in all its forms, and as connected with the affection now under consideration.

MM. Bretonneau and Trousseau relied chiefly on the use of astringent and stimulating topical measures; mild caustic substances were applied by them in all cases of diphtheritic inflammation with great success. Nitrate of silver dissolved in distilled water, in the proportion of one scruple to an ounce, is the best application in such cases. Various other stimulants, as diluted sulphuric or nitric acid, or chlorine, may also be used for the same purpose. The reader is referred to the article on malignant sore throat, on which this form of croup depends, for further details of treatment.

In Germany, the sulphate of copper has been recently introduced into practice for the treatment of epidemic croup. Dr. Leoler was successful in several cases of this disease, giving it to a child of eighteen months, in the dose of three grains, mixed with a little sugar, and then a quarter of a grain every two hours, until vomiting followed. A teaspoonful of the following mixture was given to a child aged three years, which produced vomiting after each dose.[†]

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[*] M. Borgeois, Journ. Gen. de Méd., June, 1828.

[†] ℞ Cupri. Sulphat., gr. v.
Decoc. ℞ad., Althææ, ℥iss.
Syrup. Althææ, ℥ss. M.
Hufeland's Journal, Bd. 78, 1834.

SPASMODIC CROUP.

It does not appear that this disease was accurately described until the year 1761, when Dr. Simpson published an inaugural dissertation, in which this remarkable spasmodic affection is considered under the name of spasmodic asthma of infants. A few years after, Dr. John Millar published his work on the same subject,* when it received the name of Millar's asthma. Far from rendering the subject more clear, it appears to have added confusion to the description, and rendered its identity uncertain, both from the account of it being connected with that of another disease, and from its having been described in later times under the different names of spasm of the glottis, cerebral croup, laryngismus stridulus, etc. Dr. Rush published an account of the same affection in Philadelphia, shortly after the appearance of Millar's book. In the various treatises on the diseases of children, published within a few years, the affection has found a distinct notice. Wharburton, in his work on female complaints and on children, published in 1809, describes it; and in Clark's Commentaries, published in 1815, a full description of spasmodic croup, which he refers to cerebral irritation, may be found. Of late, spasmodic croup has attracted much attention, and cases have been recorded in the different journals; those particularly of Mr. Pretty and Dr. Davies have already been referred to. Cases have also been recorded by Mr. Hood,† Dr. Marsh,‡ and Dr. Joy;‖ the last-mentioned writer giving a clear and detailed account of the disease. In Germany, also, it has been described by Dr. Kopp and Dr. Hirsch, and known by the name of thymic asthma, from its supposed dependance, in every instance, on an enlarged thymus gland. Dr. Ley has recently published a voluminous work on this subject, characterized by extensive research and great practical experience; a treatise in every respect perfect, if we except his referring it to the condition of the bronchial, or deep lymphatic glands, which, when enlarged, cause a pressure on the recurrent nerves, and thus paralyze the muscles they supply. It is often too quickly relieved, to have this organic affection for its cause in every instance.

Etiology.—Among the predisposing causes, that which exists in inflammatory croup, the peculiar condition of the larynx in children, is the most evident; for like the other form of croup, it is a disease peculiar to infancy and childhood. Although instances have occurred of its existence at the ages of five and seven years, yet the greatest number of cases occur in children during the process of teething. There is, besides age, a constitutional tendency in some children, several members of a family being the subjects of it, as was remarked by Mr. Pretty and Dr. Davies, in the papers already referred to. Other practitioners have noted the same fact, and that three in succession have been attacked when exposed to the same exciting cause. This is evident also from the fact that there is so great a susceptibility in some families to the disease, that infants even within the month have had an attack. Dr. Ley remarks, that the affection often owes its origin to the climate and season. In warm climates, it is but little known, and in dry, elevated situations, it is rarely to be found. It prevails mostly in damp, cold regions, and during the colder seasons of the year; for this reason it appears to be unknown in those parts of a country which possess a warm, dry air, while in other portions that are damp and cold it is found to be very prevalent. Dr. Ley attributes to the change of climate in America, arising from the inhabited parts being cleared of the forests, and in consequence of this change, its great immunity from diseases which arise from damps and fogs, that our earlier writers speak of its prevalence, while at this time they doubt its existence; and refers to this cause the change of opinion which Dr. Rush adopted, in the interval between the publication of his letter to Millar, in 1770, and his Inquiries, in 1794 and 1805.* Among other occasional predisposing causes, are found errors in diet, and a consequent disordered state of the digestive organs, with green discharges from the alimentary canal, and that state of the stomach of infants known as the weaning brash. There is also an increased tendency to constriction of the glottis in scrofulous children, where there exist glandular enlargements. All diseases of the respiratory organs predispose the system to this affection.

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* Observations on Asthma and Hooping Cough, 1769.

† Edinburgh Journ. Med. Scien., July, 1827.

‡ Dublin Hospital Reports, vol. v.

‖ Cyclop. Pract. Med.

Dentition is the most common exciting cause of this affection, both on account of the high susceptibility of the nervous system at that period, and ready transmission of excitement from the inflamed and swollen gums to the nervous centre, and thence to the motor nerves and their appropriate muscles, often manifesting itself in a slight muscular twitching, and which, if affecting the vocal muscles, constricting the glottis, and thus producing the peculiar sound known by the name of child-crowing—as well as from the swelling of the absorbents and glands about the neck, when the gums are inflamed, causing a pressure on the nerves leading to the part affected. An inflamed and ulcerated scalp, which is usually attended with enlargement of the glands of the neck, is also stated by him to be another cause of this affection of the epiglottis.

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* An Essay on Laryngismus Stridulus, by Hugh Ley, M. D.; Lond., 1836, p. 56.

SEMEIOLOGY.—The symptoms of this disease are well marked and can not easily be confounded with any other disease. They usually occur suddenly, on awaking from sleep in a sort of alarm; a violent and ineffectual effort to breathe takes place, which at last terminates in a long, deep-sounding inspiration, of a crowing sound.

The paroxysm again occurs in a short time, while the child is awake. The face, during the paroxysms, shows all the evidences of obstructed respiration, sometimes sallow and livid. The eyes are fixed and staring, and the whole countenance expresses great distress. The head is thrown backward, while the spine is bent in the form known as opisthotonos. After a violent and frightful struggle, the child obtains relief by a forcible and full inspiration, which is immediately followed by a fit of crying, when he falls asleep from exhaustion.

The paroxysm rarely continues over a minute or two, but has at times continued as long as ten or fifteen minutes. Several have occurred when once the disease has been excited; and an infant rarely passes a night in which it is attacked, without having three or four repetitions of the fit of stridulous breathing. Any alarm, inordinate exercise, or sudden excitement from any cause, will bring on the disease during the day when it has made its attack. The spasm not unfrequently extends to the other muscles, and the thumb is frequently drawn to the palm of the hand, while the fingers and toes are sometimes widely spread, bearing a great resemblance to the affection known and described as the corpo-pedal spasm. Indeed, being for the most part a purely spasmodic disease, when severe and long continued, it would be likely to affect the other muscles, and assume the appearance and characters of other affections of the same nature. If the disease be not relieved, the general condition of the system soon participates; the digestion generally becomes more disordered, the bowels are consequently deranged, and the alvine discharges are green and slimy, while the complexion of the child becomes pale, with a general appearance of sinking health. The duration is very uncertain, death having sometimes occurred suddenly on its first invasion, and at other times the disease has continued for weeks, or even months.

Although the paroxysm comes on in the order mentioned in by far the greatest number of instances, yet it has happened that the symptoms are renewed and the spasmodic action of the fingers and toes precedes for a considerable time the crowing inspiration, and has continued for weeks after the peculiar affection of the larynx has disappeared.

The spasmodic affection of the epiglottis may be known from inflammatory croup by the following signs: Its pathognomonic symptom is a crowing inspiration, with purple complexion, not followed by cough. In tracheitis there is a ringing sound in the cough and inspiration. It does not make its appearance like inflammatory croup, with the ordinary symptoms of catarrh, but usually in a very sudden manner, without the premonitions observable in that disease. It is entirely free from fever, unless the presence of febrile symptoms should be present as an accidental circumstance. In inflammation of the trachea, fever is an essential part of the disease, when the inflammation is established, with the ordinary signs of hot skin, high-colored urine, diminished in quantity. In spasmodic croup the pulse is small, frequent and feeble; in the inflammatory variety it is for the most part full and strong during the inflammatory or active stage, diminishing in strength as the disease approaches a fatal termination.

Spasmodic croup is always to be regarded as a dangerous disease. If the child, however, be of a vigorous frame, and possess no particular disposition to diseases of the respiratory organs, and especially if the spasms be not very frequent, and no general convulsions ensue, it must not be regarded as hopeless.

MORBID ANATOMY AND PATHOLOGY.—The pathology of this disease was until recently involved in obscurity. The dissections of Hirsch and Kopp show the trachea healthy, the thyroid and thymus glands tumefied, and sanguineous extravasation covering the trachea at the junction of these two glands. The tongue was large, and thick at the root. The body generally showed the appearance of death from suffocation, the skin being blue, and congestions of blood being found in the brain and lungs. Several other occasional departures from the normal condition existed, but the thymus gland was always found considerably enlarged, chiefly in length and breadth, but more often in thickness; the texture was not altered, although it was rather firmer, but without any trace of tuberculation, suppuration, or induration, being rather in a state of hypertrophy; from which condition a pressure was made on the heart, lungs, and large vessels. Hence it received the name of thymic asthma. The idea has been supported by Caspari,[*] Pagenstecker,[†] and Cornmaul.[‡] Dr. Rosch[||] of Schwenninger, on the contrary, entertained opinions in opposition to these views; and still more recent dissections made in Germany by Fricke and Oppenheim,[§] the plexus choroides was found full of blood, effusion in the chest, the larynx normal; the glottis was erect, and the rima glottidis open; there were no swellings in the neck, and no displacement of the par vagum or recurrent; the nerves were in their site, and the structure perfectly normal. The thymus gland did not correspond with the condition described by Kopp and Hirsch, but it was heavier than in the normal state.

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[*] Uber das Asth. Thym.; von Franz Anton, Caspari, stadt phisicus en eheminitz Heidleberger Kliniske Annalen, VII Bands, 2 Heft. Heidleberg, 1831.

[†] Beitrage zur naheren Erforschung des *Asthma Thymicum.*

[‡] Inaugural Abhandlung uber das Asthma Thymicum, von F. Cornmaul., Zweibruchen, 1834.

[||] Asthma Thymicum, von Dr. Rosch, Unteramtsarzte zu Schwenningen von Konigreich Wortemberg, Journ. Pract. Heilkunde von Hufeland and Osann lxxxii.

[§] Zeitschrift für die gesammte Medicin; Hamburg, Bd. 13, Heft. 1, Jan., 1840.

Dr. W. C. Roberts has recorded the post-mortem examination of five cases of enlargement of the thymus gland, where the symptoms were those of acute pneumonia. The editor of the New York Journal has also given the dissection of two cases with similar symptoms, and the same condition of the thymus gland.*

Dr. Ley, in the work already referred to, devotes a large portion of his treatise to the consideration of the pathology of the disease. He carefully examined the peculiar constitution in which it occurs, and finding the strumous diathesis to be that in which it most frequently occurs, endeavored, by close investigation, to discover the connecting link between this state of the system and the peculiar symptoms of the disease. This connecting link he found to be an enlargement of the thoracic and cervical absorbent glands pressing on the recurrent nerves, and thereby causing a paralysis of the muscles to which they are distributed.† There can be no question, that although dissections show that mechanical pressure may, perhaps, in most cases be the cause of this affection, other instances have arisen from a simple affection of the muscles of the glottis; for it has occurred, according to Dr. Marsh, upon the exposure of a child to the effluvia emanating from new paint, returning whenever the patient was thus exposed.‡ It has been referred to the brain by Dr. Cheyne and Dr. Clarke, the former of whom gives the result of three cases in which an incipient disease of the brain was discovered, but of different characters; one, where there was induration of the substance; in another, serous congestion; and in a third, scrofulous tubercles. The existence of scrofulous enlargements of the glands in delicate children, sufficiently explains this complication in those who are the most liable to the affection; and the facility with which it is often removed, yielding not unfrequently to the removal of irritations existing in the gums or stomach and intestines, sufficiently proves its formation, independent of any mechanical pressure on the affected parts.‖ It is evidently therefore connected with a disordered state of the nerves supplying the muscles of the glottis, whether arising from pressure on the nerves themselves, or from some more remote cause connected with convulsive action, often inappreciable on dissection.

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* Amer. Journ. Med. Sciences, for August, 1837, and Nov., 1838. N. Y. Journ. of Med. and Surg., January, 1840. N. Y. Med. Gaz., No. 2, vol. i. The opposite opinion is maintained by Dr. Chas. A. Lee, in an extended monograph in the Amer. Jour. Med. Sciences, for Jan., 1842.

† Op. Cit., p. 113.

‡ Evanson and Maunsell, p. 207.

‖ Dublin Med. Journ., vol. 9, p. 520.

That a simple derangement of nervous power is capable of producing a constricted condition of the glottis, and the peculiar sound of child-crowing, appears from the fact that this sound may be produced in children who inherit a delicacy of nervous power, by tossing them up, as is common with nurses; an immediate and intense excitement is often produced, of a nature allied to the derangement of the nervous system, where laughing and crying are remarkably blended. Fright, passion, and, as we have seen, certain odors, will produce the same effect. The effluvium from anthracite coal has also caused similar symptoms. The existence of a state of system on which convulsions for the most part depend—teething and derangement of the digestive organs—is the source to which we must look for their origin; effected by an action of a reflex kind produced on the motor nerves which control the movements of the constrictor and other muscles of the larynx. The important experiments of Dr. Marshall Hall have satisfactorily proved that the cause of all convulsive diseases not arising from the centre of the motor system itself, exists in the excitor nerves, which transmit the irritation they receive through the trifacial nerves in teething, the pneumogastric, in over-fed infants, and the spinal, in constipation and other affections of the bowels. From the spinal centre this irritation is reflected, either partially or generally, as above mentioned, by the true motor nerves to the muscular system.

A remarkable attendant on this affection, already mentioned, and which was noticed by those who first directed their attention to the subject, is the contraction of the fingers and toes. In connexion with this well-marked spasmodic affection, it may be remarked that strabismus, and spasm of the muscles moving the corners of the mouth, not unusually accompany the disease. These local spasms, the effect of dentition and disordered bowels, are the ordinary precursors of convulsions. Such morbid actions of different muscles, under similar conditions of the body, most clearly point out a common cause of the convulsive affections of infants, to which class the one under consideration belongs; convulsions being sometimes altogether local, at other times extending to the muscles of the body generally, forming at one time a local spasm, and at another a general convulsion.

The disease may also arise from a direct affection of the centre of the spinal system itself, as is shown by the remarkable instance of crowing inspiration given by Dr. Hall, in a case of spina bifida, where the crowing was produced whenever the tumor was pressed; and in another instance, convulsions were caused by pressing on the medulla oblongata of an anencephalous infant. From the extremely small opening of the glottis in infants, it is very rational to suppose that a spasmodic action of a most trifling extent affecting the muscles which close it, would cause phenomena, such as mark the disease in question, to arise. It is a disease, therefore, which although exhibiting an affection of the respiratory organs, may more properly be classed with those which pertain to the nervous system.

Treatment.—From its occurrence so frequently during dentition, the first obvious step in the treatment is to examine the gums, and where they are found swollen, to make a free incision through them to the tooth: spasms of infants, wherever they occur, either in the larynx, glottis, or throughout the whole system, often depend upon some slight irritation, or painful pressure on the nerves, even in a part remote from the immediate seat of the affection. The condition of its food, also, and the state of its stomach or bowels, should be examined, and the proper measures taken to cause a healthy supply of nourishment, suitable to the age of the child, if improper food, particularly of an artificial kind, has been used. More particular directions for the proper food of infants will be found under the head of indigestion. Daily evacuations from the bowels should be effected by mild aperients, composed particularly of such as will neutralize any acid in the stomach, if costiveness should exist. If the bowels give evidence of unhealthy secretions in the primæ viæ, alteratives may be used to promote a proper change in the secretions. The preservation of a suitable warmth by means of good clothing, especially around the neck and over the chest, is of great importance in the proper management of this disease. This should also be connected with free exposure to the open air, in fine weather, as one of the best means of giving vigor to the constitution, with suitable food, as above mentioned. This exposure ought to be free, and not partial, for there is nothing of an atmospheric nature which so soon produces a deleterious effect as a current of cool air upon any one portion of the body. For the same reason, also, cold winds should be avoided. Among other means of invigorating the system, is that of sponging the body daily with salt and water; commencing with it warm, and using it cold when the child is able to bear it, and appears to thrive under its use: this may be known by a glow appearing on the surface after the sponging.

The warm bath is also an important auxiliary in the management of this affection, from its tranquillizing effects on the nervous system.

When it is evidently connected with cerebral congestion, or when it occurs in a robust child, bleeding should not be neglected, for it may depend on a morbid condition of the brain, which must be discovered before a proper mode of treatment can be adopted.

Rubefacient applications to the throat and upper part of the chest, and, in severe cases, frequent blistering, will become necessary. When it depends on a local cause, with an inflammatory diathesis, local bleeding by leeches will be the proper treatment.

As this local affection may be at times a cause of this disease, an examination as to the enlarged condition of the glands about the neck and throat is indispensable to its proper management. This must receive the particular attention of the physician, if the first-mentioned course of treatment fail to give relief. After the application of leeches, if the glands continue enlarged, with the usual evidences of a scrofulous habit, iodine will be the proper remedy, with such other measures as are used for the treatment of that affection. The reader is referred to that section for details of its history and treatment.

In those cases unconnected with much sanguineous fulness, anti-spasmodics will be useful. Assafœtida was early prescribed by Millar, who administered it in excessively large doses : an ounce in the course of two days to a child of eighteen months. It is a highly useful medicine in spasmodic affections of these parts, from its quick and effectual operation. The proper dose will be five to ten grains to a child from four to six years, and one or two grains for one of two years of age. Musk, also, has been much used in spasmodic diseases of the air-passages, in doses of two to six grains every six hours to a child of three years ; its efficacy is so great as to cause it to be regarded by some as a specific. It is more useful in proportion to the absence of febrile symptoms.[*] There is nothing, however, that can take the place of such remedies as strike at once at the root of the disease ; and while anti-spasmodics may be found useful as auxiliary remedies, the cutting of the gums freely, promptly, and repeatedly—that they may bleed, and the distension of the gums be thus removed, and the nervous twigs be released from the pressure, while the crowding of the parts by the advancing tooth is also removed—should under no circumstances be neglected. A full enema, containing a small quantity of common salt, to cause its more prompt action, ought also to be given whenever there is any suspicion of the approach of the disease.

The application, also, of tobacco, is an admirable and prompt remedy in an attack of this disease ; and it is owing to its quick influence in the spasmodic form alone, that it has obtained its great reputation for the treatment of croup. It is best applied by means of a poultice sprinkled with Scotch snuff. No circumstance, however, can warrant the risk of an enema of an infusion of tobacco, as has been recommended and practised by some; the prostration is excessive under any condition of the system, and may in a young child be suddenly fatal.

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[*] ℞ Moschi, gr. vi.
Sacchar. Albi., ʒiij.
Aquæ Fœnic., ℥iij.
Mist. Acaciæ, ʒij. M.
A tablespoonful for a child two or three years old, every two hours.

During the paroxysm the child ought to be freely exposed to the cool air, while water is dashed in the face; the spine should also be rubbed with some stimulating embrocation, and the child placed in a warm bath as soon as it can be prepared.

PERTUSSIS.—HOOPING COUGH.

Hooping-cough was described, by the Greek and Roman writers, by terms significant of the violence and distress of its symptoms. Its nature, as might be supposed, was very imperfectly understood, and no clear account of the disease was made until the essay of Willis.[*] The treatise, also, of Millar,[†] Butter,[‡] and the works of several German authors, abound in practical matter. The most perfect account of the disease is given by Dr. Watt,[‖] of Glasgow. Much, however, remains to be known as to its nature; and at the present day, with all the assistance of numerous post-mortem investigations, the precise pathology of the disease is but imperfectly known.

Etiology.—The causes of hooping-cough are often difficult to ascertain. From its close resemblance to ordinary bronchitis, in its early and forming stage, it would appear to depend on the ordinary causes of bronchial and pneumonic diseases, and exposure to cold appears often to be connected with its development. The age of the child evidently has an influence upon the formation of the disease, for it rarely appears in the first two months of infancy; yet it will occasionally attack a child within the month.

Among other causes to which the production of hooping-cough has been assigned, that of the irritation of the bronchial tubes by the inhaling of the larvæ of insects, was a favorite one of the celebrated naturalist, Linnæus.[§] A similar view was also adopted by Rosen, with some modifications as to the direct influence of the exciting cause, regarding it as the effect of a derangement of the nervous system, by the presence of animalculi in the respired air.[¶]

It is, indeed, difficult to trace the precise agent of the disease with anything like satisfaction. There can, however, be no question of its propagation, like scarlet-fever, by a specific contagion; it has often prevailed as an epidemic, and few children escape when exposed to its influence, and, like other diseases of similar nature, it rarely occurs more than once in the course of life. Although, as was before remarked, it seldom attacks adults, yet this has occurred where there has been an exemption from it in early life, and when the individual has afterward been exposed to its influence. I have recently seen a remarkable instance of this, in the case of an elderly female who had the sole charge of a child about two years old, who was laboring under a severe attack of the disease. She had it in a very severe form, with violent paroxysms of hooping, which lasted, with gradually lessening severity, for three or four months. The occurrence was during the summer, and everything appeared to support the belief of its infectious nature.

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[*] De Morb. Convulsiv., etc., cap. xii.; Oxf. 1667.

[†] Observations on Asthma and Hooping-cough, by John Millar, M. D.; London, 1769.

[‡] A Treatise on Kink-Cough, etc., by William Butter, M. D.; London, 1773.

[‖] Treatise on the History, Nature and Treatment of Chin-Cough, etc., by Robert Watt, M. D.; Glasgow, 1813.

[§] Diss. Exanth. Viva. Vide Amœn. Acad., vol. v., p. 82.

[¶] Treatise on the Diseases of Children, by Nicholas Rosen, M. D.; translated from the Swedish; London, 1776.

SEMEIOLOGY.—The first symptoms of hooping-cough are those which usually accompany simple bronchitis, such as cough, and a slight mucous secretion. Thirst and fever, for the most part accompany it; both, however, at the commencement, very slight. In the incipient stage, which may last from ten days to a fortnight, it is often impossible to distinguish it from a simple cold, except that the cough is usually drier than in ordinary catarrhal affections, and attacks in paroxysms. These symptoms constitute the first stage. It is not long, however, before the cough assumes a decidedly convulsive and paroxysmal character. During the paroxysms of coughing a number of violent and rapidly succeeding inspirations are made, threatening the child with immediate suffocation. These fits of coughing occur at intervals of from half an hour to four hours or more, and when the disease is fully formed, the peculiar hooping sound is heard in one or two violent inspirations; after a momentary rest, another fit of coughing, with its peculiar hoop, is heard; these successive coughs and rests are at last followed by a discharge of mucus from the bronchiæ, and almost always attended with vomiting. This free secretion of mucus usually attends the disease when at its height, when the slight febrile action disappears, and the pulse shows no evidence of excitement during the intervals.

During the attacks of coughing, the face and neck are swollen and red, with every appearance of suffocation: the eyes project, and the tears start, the little patient struggles violently for breath, and suffers great distress from this cause, instinctively seizing any object within reach that can afford support; and after the paroxysm, he appears much exhausted, and sometimes becomes quite faint. In some violent fits of coughing, blood starts from the nose and lungs, and it is said even from the eyes and ears.

After a paroxysm of severe coughing, in which the child appears to be dying from suffocation, or on the point of falling into a general convulsion, all the distress and all the remembrance of suffering are at an end, for he returns to his sports with as much eagerness as ever.

As the disease differs in severity, so the number of paroxysms differs during the day, and they are less violent in proportion to the freeness of the expectoration. The second stage will continue at its height about three weeks, and then the violence of the symptoms gradually lessens, while the expectoration increases, and the skin becomes moist. By almost insensible degrees the cough loses its peculiar sound, but retains its paroxysmal character, often for a long time; but in the simple form of the disease, it usually disappears at the end of the fourth week. It frequently happens that after an entire subsidence of the affection, it will return with the distinctive spasmodic hoop, on an exposure to sudden cold, or under any circumstances favorable to the production of pneumonic disease.

It has in some instances observed an intermittent or periodic nature. A case of this kind, of a peculiarly intractable character, which occurred daily at a certain hour, is mentioned by Dr. Good.* It was obstinate for several months, and returned at the same season for two years.

The stethoscope discovers the ordinary signs of bronchial catarrh. There is no uniform sound in every part of the chest; the respiratory murmur being distinct in some parts, while the peurile respiration is discovered in others, with the mucous and sibilous ronchi. There is for some moments before and after the paroxysm an absence of the bronchial murmur and pulmonary respiration.

These are the usual symptoms, in its uncomplicated form, except so far as a simple form of bronchitis may be considered a complication; which is indeed so common, that few, if any, are found without it, so that the inflammation has been regarded by some as the disease itself.

As to the diagnosis, it is not difficult; the convulsive character of the cough and the long sonorous inspirations following it being very readily recognised, and not easily confounded with any other species of cough. Its usual attendants, the discharge of a quantity of glairy mucus, and the ready evacuation of the stomach after a paroxysm, will also aid in the diagnosis, when, as is sometimes the case in the early period of the disease, the well-known hoop is absent.

The prognosis is in general favorable. In cold and wet seasons it is more dangerous than in warm; and as the disease, however mild at first, may be complicated with other and more formidable affections, such liability ought always to be considered in forming a prognosis. In very young children, and in those undergoing the irritation of teething, or during the existence of other circumstances which tend to derange the system generally, as the change of diet at the period of weaning, these complications are more likely to occur. As the connexion of hooping-cough, therefore, with other affections, from which it, for the most part, receives its fatal character, is of so common occurrence, the consideration of these complications, existing either originally, or as they arise during the progress of the disease, will be necessary to a proper understanding of it in all its forms.

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* Study of Med., vol. ii., p. 393.

When hooping-cough is complicated with pneumonic inflammation, it is not difficult to detect the existence of this complication, from the symptoms already mentioned as distinctive marks of this affection, whether they give evidence of active inflammation of the bronchiæ, or of the parenchyma of the lungs. In the invasion of an extended inflammation of the lungs, which it is necessary to ascertain early in the disease, for its proper treatment, a change will first be observed in the pulse; which, from being but occasionally quickened during the paroxysms, becomes permanently quick and hard. So, also, the breathing is found to be hurried during the intervals, which, in simple hooping-cough, presents no departure from the healthy standard. It is unnecessary to detail all the symptoms attending pulmonic inflammation, as they do not differ from those already described; the rational signs are but added to the peculiar hoop of the disease, while the stethoscope gives the same physical signs. The fatal termination is always accompanied by all the evidences of violent congestion of the lungs, or of a complete closure of the air-passages, from the accumulation of the mucous secretion following severe bronchial inflammation.

Instead of pulmonic inflammation, there are often evidences of great gastric and intestinal disease; the furred tongue, loss of appetite, and the altered alvine discharges, show considerable derangement of the chylopoetic viscera. These symptoms, together with the existence of fever, present the disease as complicated with infantile remittent fever. When thus combined, it usually exists from the commencement, and in many cases appears to precede it, when it is essentially connected with its development. The approach of the fever is very gradual, and its commencement difficult to ascertain; but the evidences of great derangement in the secretions of the abdominal viscera always exist before the fever has made its appearance. During the fever the respiration is hurried, and the coughing severe, but the stethoscope will detect the absence of inflammatory disease in the chest.

When hooping-cough is connected with cerebral disturbance or turgesence, partial convulsions soon appear in the hands during the paroxysms of coughing; these are almost invariably followed by general convulsions. They are often caused simply by the interruption to the circulation in the jugular veins, by which the cerebral vessels are crowded with blood, while the face becomes livid in the midst of a fit of coughing, without the presence of a distinct hoop. These turns are extremely dangerous, especially in very young infants, for they almost invariably, if of frequent recurrence, terminate in effusion and death. The permanent dilatation of the pupil marks the invasion of cerebral disease.

This complication of hydrocephalus is generally preceded by convulsions; but sometimes it makes its invasion very gradually, the child giving the first intimation of it by coma, and paralysis of one side of the body, while the arm of the opposite side is moving in the sawing manner, so often observed in cases of cerebral effusion in children. Wherever, therefore, there exist convulsions, or paralysis on one side, we may very reasonably infer the existence of effusion in the brain. When the convulsion is general, before coming to the same conclusion we should ascertain the precise history of the case, the hereditary tendency in the family, and other circumstances connected with the predisposition to this disease, pointed out in the article on that subject.

It may be looked for when there is great drowsiness, and at times screaming and starting during sleep, followed by fever and vomiting; while the alvine evacuations give no evidence of a disordered state of the secretions of the abdominal viscera. The breathing in the hydrocephalic complications is not quick but often deep and sighing; a remarkable difference from what takes place in inflammatory diseases of the chest.

Morbid Anatomy and Pathology.—Dissection, in the simplest form of hooping-cough, has revealed but little as to its peculiar pathology, besides the inflammation of the bronchial tubes. The simple disease, uncomplicated with other affections, is seldom fatal; on this account it is that autopsical investigations have shown, in the greatest number of instances, the presence of inflammation, and its effects in other organs distant from the immediate seat of the disease, as the most marked symptoms would indicate. It would be an unsatisfactory and almost an endless task, to record the results of post-mortem examinations which have been made to ascertain the seat of this peculiar disease, as complications, in some form or other, have for the most part been its attendants. The following appears to be the summary of the results of these examinations, and the theories resulting from them.

Where opportunities have occurred, in which the disease has had but little or no complication, bronchial inflammation in various stages of its progress has been found, as appears from the red color of the mucous membrane, and the presence of a greater or less quantity of mucus at the same time in the tubes, together with the existence of purulent matter at their extremities.* A dilatation of the bronchiæ has also been frequently seen in connexion with this inflammatory state, but principally confined to the extreme branches, as pointed out by Laennec. In connexion with other lesions, traces of inflammation of the lymphatic ganglia, near the bronchiæ, have existed in a number of instances. Again, the lungs have been found in a state of induration, showing, in severe cases, the existence of inflammation in the parenchyma of these organs, as well as in the mucous membrane lining the air-passages. In other instances, tubercles have been discovered, in a state of suppuration, at the root of the lungs.

The lesions which are found in complicated cases are as various as the diseases which attend a protracted case of hooping-cough. In addition, therefore, to those above mentioned, it is not unusual to find chronic enteritis, worms, and other affections of the viscera of the abdomen. The great sympathetic and splanchnic nerves have exhibited a firmer consistence than is natural, and the cæliac plexus is considerably firmer and more elevated. So, also, the trunks of the phrenic nerve and the vagi have been found enlarged and looser in their texture.

In other instances, the only lesion that has been found was in the brain, where effusion of serum existed; from which it would appear to be solely dependant on the condition of the brain. When, however, effusion is found in the brain, it is connected with bronchial affection; so frequent is this occurrence, that it has been denominated by some French authors, broncho-cephalite. It is unnecessary to record the various appearances found in this complication, as they will be fully detailed when the subject of hydrocephalus is under consideration.

On these appearances, when considered in connexion with the symptoms which the disease exhibits, the different views as to its nature have been founded. And it is not a matter of surprise that so many different ideas of the pathology of the disease have existed, when the post-mortem appearances have been so various, and the disease often so obstinate and uncontrollable; thereby apparently disproving the preceding theory, which in its turn, also, has been supplanted by other hypotheses.

The theory of its purely inflammatory nature has been adopted by Watt, Guersent, Laennec, Billard, Dawson, and others. Dr. Watt especially, who wrote largely on this affection, regarded it as always inflammatory, and affecting the larynx, bronchiæ and air-cells alone, when mild; and when serious or fatal, it is either transmitted to other parts, or affects the original seat of the disease, with the usual consequences of severe inflammation. The reasons for regarding it as purely and always inflammatory, are, that the ordinary bronchial inflammation, occurring in winter, not unfrequently shows a tendency to spasmodic action; and that the results of autopsical examinations in hooping-cough prove the existence of inflammation in the bronchial tubes, as in bronchitis. As to the precise location of the inflammation, Dr. Dawson is of opinion that it is exclusively in the larynx or glottis, while others think its seat to extend throughout the whole of the air-passages. By others it is regarded as a spasmodic disease, arising from the condition of the brain, or of some other portion of the nervous system: Cullen, Löbenstein, Le Roy, Hufeland, Jahn, Breschet, and Webster, adopt this opinion; the last-mentioned writer placing it in the brain, and considering that the affection of the respiratory organs is altogether secondary, from an effort of nature to relieve the congested brain by an expansion of the chest.* Hufeland, Jahn, and Breschet, were disposed to regard the phrenic and pneumo-gastric nerves as the original seat of the affection, and that the lesion constituting the disease continued there; while Löbenstein believed that the disordered action originally existed in the diaphragm, and was subsequently communicated to these nerves.† Dr. Copland's opinion is that it is a disease of nervous irritation alone, having its commencement in the respiratory organs and transferred principally through the medulla oblongata, and again transferred to the lungs and also to the stomach; and that other concomitant causes, or a predisposition, may convert it into an inflammatory affection.

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* Ballard, Op. Cit., p. 427.

In addition to these views, M. Desruelles, in the work already referred to, regards the disease as bronchitis complicated with cephalitis, the one invariably preceding the other; the primary affection causing a simple cough, while the subsequent irritation of the brain produces a spasmodic action of the respiratory muscles.

Without adopting any of these conflicting views, it is enough for all practical purposes to keep in mind, that at the commencement of the disease it is inflammatory: increased vascular action for the most part existing, in some instances perhaps in a very slight degree; but that it is essentially the nature of the disease in its first stage, is evident from the fact of the presence of symptoms which point out this condition of parts, if the local affection be increased even but a little. Expectoration accompanies the cough at the beginning, like ordinary catarrh or bronchitis, while a slight febrile action is a very common attendant, rendering the diagnosis at this early period often doubtful. The stethoscopic signs also give evidence of a similar condition of the parts affected.

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* Med. and Phys. Jour., Dec. 1822.

† J. Wendt, Der Kinderkrankheiten systematisch dargestellt; Wien., 1835.

While it is in the first stage an inflammatory disease, or perhaps a complication of inflammation with some inexplicable action of the nervous system, which modifies the simple bronchitis, it is unquestionably in the last, one in which spasmodic action prevails, as is abundantly evident from the success in adopting such remedies in its treatment which are known to exercise a controlling influence over the morbid sensibility and actions of the nervous system. Severe pulmonic inflammation, however, will arise during its progress at any stage.

The cough, which is an act of expulsion from the lungs of the air for the removal of a foreign body, as in the present instance, of a quantity of mucus, is so violent as to exhaust the lungs almost entirely, and hence the loudly-sounding hoop on a sudden inspiration to supply the vacuum; hence, also, the congested state of the blood-vessels about the head and neck, and the asphyxiated appearance of the face in protracted paroxysms.

The different complications of this disease must be regarded as secondary affections, arising from the excessive congestion produced in the fits of coughing, of which hydrocephalus is the most common when the disease is fatal.

TREATMENT.—From these views the treatment of ordinary hooping-cough may be easily deduced; it must be antiphlogistic in the first stage, and when this is relieved, anti-spasmodics and sedatives will, in general, be indicated. Although our remedies should be at first of such a nature as to allay the inflammatory action of the part, yet it is evidently unnecessary to adopt any active measures of this sort in all cases, for in many instances in simple hooping-cough there is but little interference needed. During the existence of symptoms of catarrh, the diet should be light, consisting of milk and vegetables, while the child is kept within-doors, and clad warmly; this course, together with the constant use of warm diluents, the breathing of warm air, and pediluvium, will tend to preserve the skin in a soft and active condition. At the same time the bowels should be kept open by mild cathartics; a few grains of rhubarb, combined with ipecacuanha, may be used for this purpose.[*] If these do not also operate as an emetic, those of a more effective character may be given. Ipecacuanha, in the form of syrup, or the compound syrup of squills, may be used, according to the age of the child, and the urgency of the symptoms. Proper formulæ for emetics will be found at page 45. Emetics are particularly useful in this disease, and should be repeatedly employed—unless counter-indicated by a phlogosed state of the gastric mucous membrane—until expectoration is freely established. It has sometimes been found difficult to induce vomiting: when such a difficulty exists, it is usually an indication of a severe form of disease; apparently, too, depending at times on the existence of an inflammatory state; at others, on the congested condition of the nerves on which the act of vomiting depends. An antimonial emetic may be needed in some cases, and all measures used to prevent the occurrence of active inflammation of the bronchial mucous membrane or parenchyma of the lungs, on the prevention of which the welfare of the patient often altogether depends. The progress of the symptoms must be carefully watched, and if there exist any signs of increasing inflammation in the lungs, early and efficient bleeding must be resorted to, to prevent at once, if possible, the establishment of a serious and perhaps uncontrollable inflammation of the lungs. While the means for controlling the inflammation are in active operation, such as will promote a free expectoration must be used; and those that are applicable to bronchial and pulmonary inflammations may also be had recourse to, when indicated.

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[*] ℞ Pulv. Rhei., gr. xij.
Pulv. Ipecac., gr. ij.
Sacchar. Alb., q. s. M.
Ft. Pulv. No. iv.

One to be given every night to an infant; two for a child of two or three years.

℞ Pulv. Rhei., gr. x.
Hydr. Subm., gr. iij. M.
Divid. in Pulv., No. ij.

One for an infant of six months, to be repeated in six hours.

It has been the custom to be rather cautious in the use of the lancet, where there are evidences of much spasmodic action present; but where the inflammatory condition is evidently on the increase, a free bleeding is absolutely necessary, and can by no means be dispensed with, to arrest that state of the diseased part which gives to hooping-cough its dangerous character, and which is always found after death to exist, unless the morbid action has been entirely transferred to other and distant parts. Leeches are highly useful, when the violence of the constitutional symptoms have been in some degree arrested, or when, from some peculiar debility of the patient, general blood-letting is counter-indicated. Like all other pulmonary affections, hooping-cough receives but little benefit, in its simple form, from the use of active purgative remedies; indeed, the unfavorable symptoms have at times appeared to be increased by their use, the operation of a cathartic scarcely ever being unattended with some degree of spasmodic action of the bowels, as appears from the griping effect usually attendant on its operation. In general, it will be necessary to preserve a proper secretory action in the intestines, by the use of mild laxative medicine; and such as have already been mentioned may be used for that purpose. On some occasions, however, the use of these may be hazardous, when there exist a morbid irritability of the stomach and intestines, and other evidences of gastro-intestinal inflammation. Under these circumstances, neither emetics, in general so useful in hooping-cough, nor laxatives, should be used, but the treatment ought to be conducted by the warm bath, blistering, and small doses of nitre; while the bowels are kept open by enemata.

It is in the second stage, or period of spasmodic action, often unattended with inflammation, that the host of specific remedies has been successful; and although their use has been denounced by some as empirical, yet experience has fully proved the highly practical advantages resulting from the employment of anti-spasmodic and sedative remedies, and that success has often followed a judicious use of these means.

The extract of conium maculatum has been highly praised for its efficacy in allaying pulmonary irritation, and especially that form which constitutes the disease in question. To obviate the objection urged against its use by some, that it arrests the expectoration, it has been given in combination with tartar emetic, by some German physicians.[*] When used alone, it may be administered in the dose of half a grain to an infant, and one grain to one between the ages of two and four years. Having had no experience in the use of this remedy, I can only speak from the experience of others.

For the same purpose, opium has been extensively used. Henke, Millar, Kirkland, and others, extol it highly in the spasmodic coughs of children. Opium should always be combined with some nauseating remedy, whereby its controlling effect on the secretions may be counteracted. Dover's powder offers a good form for this purpose; or the combination recommended by Dr. Pearson, consisting of a draught composed of a drop of tincture of opium, five drops of wine of ipecacuanha, and two grains of carbonate of soda, for a child of two years, to be repeated every fourth hour for several days.

Hyoscyamus, also, is another of the narcotics that has been used in the treatment of hooping-cough. Its properties are analogous to those of opium; but it does not interrupt the secretions like opium, and is on this account to be preferred. I have found a most decided benefit to follow its use in protracted cases, giving it in the extract with water, or in case of the presence of any slight degree of febrile action, combined with antimony, as recommended by Hufeland.[†]

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[*] ℞ Ex. Conii, gr. ij.
Antim. Potass. tart., gr. j.
Aquæ, Destill., ℥ij.
Syrup. Croci., ℥ss.
To be taken in the course of two days, by an infant.
Schlesinger.

[†] ℞ Extr. Hyoscyami, gr. x.
Vini Antimon., ʒij. M.
Eight drops four times a day, to an infant a year old.

℞ Vini Antim., 3j.
Extr. Hyoscyami, gr. iij.
Syrup. Simpl., ℥ij. M.
A teaspoonful every two hours, to an infant from six months to one year.

Assafœtida is another medicine that has been used with success for the relief of the spasmodic disease. Millar was the first who prescribed it, giving it in enormous doses. The Germans, also, have used this remedy in the latter stage of hooping-cough, with a relief of the paroxysms, and a general improvement to the secretions generally.[*] Musk is another medicine extensively used in this disease, in the dose of two or three grains to infants of a year old, every hour. Belladonna, a powerful sedative and narcotic, and possessing, also, the qualities of promoting the excretions, has likewise been much employed for the purpose of diminishing the irritability of the nerves supplying the laryngeal muscles. To a child two years old a quarter of a grain may be given three times a day, and half a grain to one of four years. It was used by Dr. Kahleiss, with great success, in one hundred cases of pertussis, in conjunction with ipecacuanha and sulphur, and the alternate use of hydrocyanic acid. This method has also been used by Dr. Valk, of Providence, R. I., with similar success.[†] The subjoined formulæ are those which he used for a child of seven months; four times the quantity was used by Dr. K., for children of the age of two years.[‡] Other practitioners speak highly of its good effects, when the disease is purely spasmodic.

Hydrocyanic acid has also been greatly extolled by Dr. Muhrbeck, of Demmin,[‖] and Dr. Hamilton Roe;[§] the latter especially observes, that it is so uniformly successful, that when he finds a child that has not been relieved by it, the first impression is, that the medicine could not have been good. Dr. Atlee, of Philadelphia, has used it in a great number of cases, and completed a cure in from four to fourteen days. His method of administering it was, to give a teaspoonful of a mixture, containing one drop of the acid in an ounce of syrup, twice a day to a child six months old, increasing it to three teaspoonfuls, if no bad symptom followed its use. He adds two drops to an ounce of syrup, for a child between the ages of one and two years, and an additional drop for each year. The subjoined is a prescription of Dr. Roe.[¶]

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[*] ℞ Assafœtidæ, ʒij.
Mist. Acaciæ,
Syrup althϾ, āā. ℥j. M
A teaspoonful every two hours, to a child three or four years old.

[†] Amer. Journal Med. Science, vol. vii., p. 417.

[‡] ℞ Pulv. Rad. Bellad., gr. j.
" Doveri, gr. ijss.
Sulph. Precip., ℈j
Sacchar. Alb., ℈ij. M.
Divid. in Chart. No. xx.
One powder every three hours, and between each dose, twelve drops of the following mixture:

℞ Aquæ Camomile., ℥ss.
Syrupi Simpl., ʒij.
Acid, Prussic., gt. vi. M.

[‖] Rust's Mag., January, 1836.

[§] Treatise on the Nat. and Treat. of Hooping-Cough, etc.; London, 1838.

[¶] ℞ Acidi Hydrocyan., (Scheele's), ♏. xij.
Liquor. Antimon., Tart., ʒj.
Tinct. Opii. Camph,, ʒijss.
Musturæ Camph., ℥vijss. M.
A tablespoonful every four hours, to a delicate boy of four years old, to be given in some warm drink.

In protracted cases, attended with great debility, tonics have been resorted to, and found highly efficacious. In many instances cinchona has been used alone, and combined with cantharides, for the restoration of the lost strength, and to break the habit of a periodical return of the paroxysms. However useful it may have been found to be, cantharides ought never to be given to very young children, from the extremely irritable state of their nervous system. The following is the formula recommended by the late Dr. Beatty, of Dublin.[*] Cinchona is more useful where the disease assumes a periodic character; while the preparations of iron, as the sesquicarbonate, are more applicable to such cases as are attended with a decided debility of the system. This last-mentioned preparation has been given in very large doses; even to the amount of twenty-four to thirty grains in the course of a day, to very young children. The bowels should be kept free whenever tonics are used, and their employment ought to be suspended whenever symptoms of congestion or inflammation appear.

Arsenic was used by Dr. Ferriar, for the same purpose, in doses of a drop daily of the solution of Dr. Fowler; and Guersent advises, under the same circumstances, the oxide of zinc, a grain every hour. According to the experience of some, arsenic has effected a complete cure in the course of a fortnight; it is, however, too hazardous a remedy to be generally adopted. The acetate of lead also has been used with benefit where tonics are indicated; it is liable to the same objections as arsenic, and ought rarely to be given to young children. Nitrate of silver has been employed where tonics are indicated. When, however, there exists a necessity for the use of tonic remedies, the sulphate of quinine, probably, is the best.[†]

During the application of these remedies, stimulating embrocations may be useful to establish a revulsion on the skin; and the "Pommade d'Autenreith" has been much used for this purpose; it differs but little from the tartar emetic ointment in common use in this country. This ointment is prepared by adding one drachm of tartar emetic with seven of lard; a drachm of which should be rubbed on the chest and epigastric region, night and morning, until a crop of inflamed tumors appears. An old and valuable external application is that made of the oil of amber, oleum succini, combined with common oil, with the addition of the oil of cloves; two ounces of the oil of olives, with half an ounce of each of the others, for an embrocation.

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[*] ℞ Tinct. Cinchon. C., ℥v.
" Canth.,
" Opii Camph., āā ℥ss. M.
ʒss.—ʒj. three times a day.

[†] ℞ Quinæ Sulph., gr. x.
Acid. Sulph. Dilut., gtt. xv.
Aq. Cinnam., ℥ij. M.
A teaspoonful three or four times a day, to a child of two years.

An endermic method of treating hooping-cough, although to accomplish a different object from that usually intended by external applications, has within a few years been recommended by Dr. Brendt.* He employed the acetate of morphine, by applying a grain of the salt to the blistered surface whence the skin had been removed. Four grains of powdered gum arabic were mixed with it, and applied by sprinkling it over the spot. In several instances it was attended with decided benefit, but not until the full effects of its narcotic power had been experienced. On this account it can not be unattended with hazard, as we have the remedy so little under our control; the power of absorption differing greatly in different individuals.

Fumigation with the vapor of benzoin, was accidentally discovered, a few years since, to allay with remarkable quickness the paroxysms of hooping-cough, which had continued for nearly three months, during which time several remedies, including belladonna, had been used in vain.† The vapor of tar has been used by Dr. Watt with success; and the fumes arising from warmed spirits of turpentine, it is also said, have been followed by decidedly good effects.

In all cases of obstinate hooping-cough resisting the succession of remedies, which in all probability will be tried, a change of air will be often of inestimable benefit to the patient, and should by no means be neglected, when it is in the power of the patient to obtain the advantage of so powerful a tonic. It is in summer almost invariably followed by an improvement in the symptoms, and may at that season be used in all the stages of the disease, unless, indeed, a violent inflammation of the lungs should render such an exposure hazardous.

Such are the means to be used in the treatment of hooping-cough, as it for the most part occurs. Inflammation of some portions of the pneumonic system, in a degree at least, even if slight, so invariably attends it in the first stage, that it can scarcely be regarded as a complication of the disease. The affections of the bowels, however, and of the chylopoetic viscera generally, must be regarded as a very serious complication, as this state of the system so often precedes hydrocephalus in young children. It therefore demands the closest attention of the physician; and the peculiar symptoms already pointed out must by no means be disregarded, as upon the restoration of the healthy action of these important viscera, the success of the treatment in a great measure depends.

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* Klinische Mittheilungen, von Dr. F. A. G. Brendt, Königl. Geheimen Medizinal—Rathe, Greifswold, 1833–34.

† Pfaff's Mittheilungen, lste Jahgr., 1 und 2 Heft.

When, therefore, the tongue indicates the disordered action in the primæ viæ and their appendages, and a constipated condition of the bowels exists, it will be necessary to administer a cathartic, which should be repeated occasionally, until the secretions of these parts have given evidence of a recent secretion, by an entire improvement in their appearance. A regular action of the bowels should then be kept up by the use of milder measures. To fulfil the first indication, calomel, in full doses, will be found the most effectual for the removal of the morbid turgescence of the abdominal viscera, and the speedy restoration of their functional activity. Calomel and rhubarb, or a few grains of calomel, followed by infusion of senna, will be the best to fulfil this object. After the bowels have been freely moved, a mixture of blue pill and rhubarb will suffice to preserve their action.*

It is not unfrequently found that the secretions exhibit much alteration in their character, while the alvine evacuations are natural, as regards their habitual recurrence; it will not be necessary, under these circumstances, to use the more active purgative medicines, but simply the mild combination already mentioned.

Although cathartics have been but little employed in the management of this disease, yet they have been found necessary where the alvine secretions exhibit departure from their ordinary healthy character. Sometimes they are deficient in bile, as in jaundice. It will then be necessary to employ the more active cathartics, as calomel, jalap, and colocynth, to excite a more natural sensibility in the intestinal canal and its appendages.

It is probably the deranged state of the secretions, with the predominance of acid in the imperfectly digested contents of the stomach, and the relief which has followed the use of alkalies and absorbent preparations, combined with those that exert an influence on the secretory function of the bronchial mucous membrane, that has brought these remedies so much in repute as to have rendered them popular. The disease has been regarded by some as in every instance necessarily connected with an acid state of the stomach. Such a condition is not peculiar to this disease alone, children suffering from any acute disorder have more or less derangement of the stomach and bowels. It is therefore always safe practice to keep this in mind, and whenever there is any evident derangement in the primæ viæ, to combine an antacid with the prescriptions used. It is of more importance than it is often conceived to be. The effects of acidity of the stomach are often exceedingly annoying, as we are all aware, producing a dull heavy pain in the head, a feeling of stricture about the brain, a languor and unfitness for active mental exertion, but quickly relieved by neutralizing the acid. If such be the effects in the adult, how much more dangerous in the irritable condition of the infant state. It therefore should have our constant attention when prescribing for infantile diseases. It is this state of the stomach which probably renders the operation of an emetic, combined with cretaceous powder, as was used by Dr. Fothergill, so beneficial in the treatment of hooping-cough.

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* ℞ Pul. Rhei., gr. x.
Hydrarg. Oxid., gr. iij. M.
Fit. Pulv., No. iij.
One every night, to a child a year old.

When the secretions continue unaltered, and there is evidence of the constant presence of acid in the stomach, the hydrargyrum cum cretâ, combined with the rhubarb, will be a good combination for correcting this state of the stomach, and improving the secretions; it is peculiarly suited to the bowels of young children, being an extremely mild and unirritating preparation.* It occasionally happens that the bowels are in an extremely irritable condition, forbidding the use of laxatives in any form, while the secretions are in an unhealthy state. Here the object will be, while we attempt to improve the secretory functions of the liver and intestinal mucous membrane, to allay the morbid irritability of the primæ viæ. This is best done by combining the above-mentioned preparation of mercury with Dover's powder,† while anodyne enemata are used in cases of violent tenesmus and irritation in the rectum. This powder ought to be followed by a little castor oil, when the morbid irritability is removed.

By close attention to the secretions of the bowels, and their appendages, we may prevent the occurrence of convulsions and effusion in the brain. When convulsions make their appearance, all the usual sources of irritation in infants must be examined, and if the gums be found swelled and inflamed, they must be freely divided. Convulsions will sometimes continue for a long time, without being in any degree relieved by the usual means employed for their removal. When this is the case, an entire change of diet will be necessary; this subject will be more particularly noticed under the article on indigestion, and that of convulsions.

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* ℞ Pulv. Rhei, ℈j.
Hydr. c. Cretâ, gr. x.
Pulv. Sacch. Alb. gr. x. M.
From three to five grains every third hour.

† ℞ Hydr. c. Cretâ, ʒj.
Pulv. Ipecac. Co., ℈ij.
Sacchar. Alb., ʒss. M.
Four to six grains for an infant of six months, to be repeated p. r. n.

CIRCULATORY SYSTEM.

PECULIARITIES OF THE CIRCULATORY SYSTEM.

At the period of birth, on the establishment of respiration, a remarkable change takes place in the circulation of the blood. The heart, from being in the fœtus a single organ, like that of the crustacea and pisces, intended but to send the blood through the vascular system, for nourishment and growth, becomes double in its action, and in fact double in the arrangement of its parts. Upon the full development of respiration, a new set of vessels is brought into action; and in addition to the circulation of the sanguineous fluid through the nutritive capillaries, another direction is given to it, and another circulation is superadded—that through the lungs, for the restoration of its nutritive properties, a process hitherto dependant on the mother—while other vessels peculiar to the fœtus are obliterated. The heart, then, for the first time undergoes a change in its internal form, by which there are two distinct organs, although united in one; that on the right side transmitting the blood through the lungs, forming the pulmonic circulation; the other, on the left, denominated the systemic circulation, for the nourishment of the body. Although at once entering into the full discharge of its functions, the heart is still peculiar, and in some respects differs from the adult heart.

But before these are noticed, it is proper to refer to the changes which occur on the establishment of the independent circulation, and the period at which it occurs. A number of new-born infants were examined by M. Billard, with reference to the precise period at which the fœtal openings were completely closed, and found to vary from the age of one day to that of eight days; a detailed account of them may be seen by referring to his work.*

The result of all these investigations is, that the fœtal openings are not always closed immediately after birth; but the period is extremely variable, occurring, however, usually on the eighth or ninth day after birth. The circulation ceases first in the umbilical arteries, next in the vein; the ductus arteriosus is next obliterated, and lastly the foramen ovale. These openings may therefore continue, without producing any symptom of disease.

The mode of the obliteration is detailed at length by the author above-mentioned; and the result of his observations is, that the blood in the arteries is forced through by a succession of modifications occurring in their parietes, by which their calibre is gradually reduced in size, while in both of the fœtal veins the arrest of the circulation occurs as the result, and not the cause, of the retropulsion of the blood.

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* Op. Cit., p. 436, et. seq.

The blood of an infant, therefore, can not, during the first days of life, undergo so perfect an oxygenation as afterward, as it does not all pass through the lungs. M. Billard is of opinion, that it is not necessary that the blood of an infant just born should be charged with too much stimulating properties, and that this state of transition is better adapted to the imperfect condition of the infant frame, whose organs might be too powerfully excited by a sudden supply of perfectly oxygenated blood.

The lungs, on the first establishment of independent life, might be suddenly congested; the patulous state, therefore, of the ductus arteriosus affords a relief to this condition, and allows the blood to flow through it, as the congested state of the respiratory organs will not permit the air to arrive freely in the cells.

In infancy the heart, like other muscles, is much softer than at later periods of life, and its color is paler; it is also much thinner. At the time of birth there is no difference in the thickness of the parietes; but after the closure of the fœtal openings, those of the left ventricle, from the increased demand made on them as the entire source of transmission of blood through the systemic circulation, rapidly increase in thickness, until they become four times as thick as those of the right.

At this time, although the parietes of the heart are the same in thickness, the cavities differ in their capacity, the left ventricle being much the largest. Gradually, however, after birth, the capacities of these cavities are reversed, that of the right side becoming the largest, from the causes already stated, which produce an alteration in their parietes. The color of the right cavities is usually of a deep violet. In this respect they also differ from the left, which are of the usual red. The larger vessels of this side also present the same color, which does not appear to depend on venous turgescence.

As the organs of circulation are in an active state even during the fœtal life, the nerves of the ganglionic system, which supply the heart and involuntary muscles, are much more developed than those of the cerebro-spinal system.

The heart of an infant is of large size, but possessing less powers than the heart of an adult; it is, therefore, more fitted for the transmission of a large quantity of blood, but not to so great a distance. Its great irritability, or, as it has been termed, organic force, renders its contraction much more active than in after life; a remarkable provision, by which the demand of the system for nutrition, during the period of growth, is quickly supplied, for a large quantity of materials is constantly needed, at a time of life which is characterized as one of transition from an imperfect state to a state in which all the organs are adapted to the full performance of their functions.

Jacquemier, in his treatise on auscultation, has endeavored to establish the medium pulsation of the heart of an infant; and after a great number of experiments, has found the minimum pulsation in a new-born child to be 97, the maximum, 156, and the medium, 126.50.*

M. Lediberder, in a memoir on the changes occurring in the circulation of an infant at the moment of birth, states, that the result of auscultating the heart, even before the umbilical cord was cut, gave eighty-three double pulsations in the first minute; but they quickly increased in number, for after the third minute the medium pulsation in sixteen cases, was 160.†

The pulsation of the radial artery, which is not always isochronous with that of the heart, has been variously stated by different authors; Floyer fixed it at 134, Haller, 140, Sœmmering, 170. Billard states, that the pulse in new-born children often does not exceed that of an adult, but that it increases in frequency in proportion as the child advances in age; and in the generality of cases, the pulse of children is more frequent, he observes, than in adults.

In a great number of experiments conducted by M. Valleix, the average pulsation, at the age of 2 to 21 days, amounted to 87; at at 64.7 months, to 108.31; at 23.6 months, 121.68; at 11 months, 129.9; at 14 months, 125.66; and at 20 months, 117.75.‡ The pulse, at the age of seven months, is much more frequent than at a few days after birth; it afterward diminishes until the age of six years; after this period, there has been nothing ascertained as to the effect of age on the pulse. M. Trousseau has found that the average pulsation of infants from eight days to six months old is 131 for boys, and 134 for girls; from six to twenty-one months the average for boys was 113, and for girls 126; he also found the extremes to vary frequently far above and below the average. The state of sleeping and waking also exerts an effect on the pulse, as was ascertained by Trousseau, the average pulsation in the former state in infants from fifteen days to six months was 121, and in the latter 140; and in infants from six to twenty-one months was 112 during sleep, and 128 while awake; there is also a remarkable difference where the child is alarmed.

The result of all these examinations is, that the pulse of children at the breast varies from 100 to 150; after the first two months it is a little more frequent in females than in males; and it is about twenty pulsations higher in a state of waking than it is during sleep.*

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* De l'Auscultation appliqué au Systeme Vasculaire du Fœtus, etc.; Paris, 1827.

† Valleix, Op. Cit., p. 26.

‡ Op. Cit., p. 25.

The healthy pulse of infants is very soft, and easily compressed; the artery, instead of striking the finger, appears to glide under it, requiring some care in pressing on the vessel. The crying of the child has a very marked effect on the pulse, even before it has commenced; for when a child is about to cry, there is often so great an increase in the pulsations, that it is difficult to count them.

With respect to the ordinary characters of the pulse, as indicating disease, they do not differ from that of an adult; but this subject will be considered in the next section.

Among the many differences existing between the child and the adult, arising from the demand for the materials for growth, there is none more remarkable than the proportion which the blood-vessels bear to the other organs. The arteries abound in every part of the infant frame; and during this period of active interstitial deposite, the sanguineous appearances are very remarkable in every part of the structure, even of the most solid, when subjected to anatomical examination. These gradually disappear after the period of youth, and are scarcely to be found on separating the periosteum from the bones in old persons. This contraction and disappearance of the arteries take place in the extreme branches; and, as was observed by Bichat, the younger the subject the more easily could injections used for making anatomical preparations be made to pass to the minute portions of the arteries; while in the old, such is the resistance which the contraction of the smaller vessels oppose, that it is with difficulty that even the largest trunks can be filled. At an early age, also, the coats of the arteries show very plainly the existence of the vessels which belong to them; but which gradually disappear in after life.

The changes thus occurring in the arteries depend on their containing much more cellular substance than the veins, and the increasing condensation of this substance produces a thickening of the vessel. Changes to such an extent, however, do not occur till late in life; and this is the reason why the young are more subject to arterial hemorrhage than the old; for, in the former, the quantity of blood in the arterial system is always most abundant, and the power of contractility of the arteries much greater: all this tends to distend the extreme parts of the arteries, and also to add to the bulk of the body. In the old, the veins have gradually dilated, while the arteries have contracted their calibre; the arteries, therefore, yield more readily to the force of the circulation in early life, and the plethora of young people is that of the arteries, while in age it is in the veins.

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* Journ. de Méd. et de Chirurg. Prat., Aug., 1841.

As the capillaries are the principal agents in the nutrition of the body, and necessarily form the most intimate part of the texture, they must therefore abound at the early period of life, when the increase of parts is the most characteristic phenomenon. On this account, also, it is that diseases in early life are so sudden and so violent, and require more prompt and energetic treatment than those of adults: all the morbid phenomena having their seat in the capillary system, which is at this period of life in so active and vigorous action in building up the body.

The quantity of blood in the body of an adult is estimated by Haller at about one fifth of the weight of the body; but as all the fluids abound in infancy and youth, the proportion is much greater in early life, when the continued addition of new materials is more needed than at an after period of life. The consequences of this activity of the circulation, and redundancy of fluids, may be traced in all the organs. The blood is not only sent in abundance to every organ, but is better prepared, by the air acting on a much larger portion of it in a given time, for the purposes of nutrition and secretion. The round and plump form of the infant, and the softness of all its parts, show this redundancy, while the bright red color of the skin gives evidence of the constant circulation of aereated blood through its tissues.

There is also a difference in the composition of the blood in infancy and early life. At this period the proportion of azote is less than in advanced life; the watery exhalations also are greater, and the fibrine less. In the fœtus there is no fibrine at all, but the blood contains in its place a gelatinous substance, which does not become reddened by contact with the air; neither are there any phosphoric salts found in this fluid.* Phosphate of lime and fibrine increase with the growth of body, and the former, in adult age, sometimes becomes excessive. In proportion to the increase of these elements, the quantity of gelatine diminishes, and also changes in quality, as is well known to glue-manufacturers, for the glue obtained from the young differs materially from that yielded by adult animals.

The condition of the secreted fluids naturally falls under another division of the subject, and will be considered when the lymphatic apparatus comes under our notice.

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* Fourcroy, Anal. de Chimie, t. vii., p. 162.

Symptoms

SIGNS OF DISEASE FROM THE CIRCULATORY SYSTEM.

Affections of the heart, during the first periods of life, generally arise from congenital lesions, in which they differ from the abnormal state in the adult or advanced age, where they arise from ossifications, or from diseases of the bronchiæ or lungs. Contractions in infancy arise from fibrous or cartilaginous degeneration, while they are of an osseous nature in old persons.

Palpitations often arise in young girls, which do not occur from any organic lesion; they usually disappear on the establishment of the catamenial discharge. It is unnecessary to detail at length the various signs of diseases which may be drawn from the pulse and appearances of the blood; these do not differ from those in similar diseases in adults, the difference in frequency being taken into consideration. The following signs, however, are peculiar to many diseases of children:—

A frequent pulse may occur in inflammations, especially of the mucous, synovial, and serous membranes; but a frequent pulse seldom occurs in inflammation of the brain: it is, on the contrary, strong, hard, and full.

The pulse is also frequent in extreme debility, when it will at the same time be found small and weak; it then yields an unfavorable prognosis after the continuance of acute disease, as it indicates the first degree of effusion in hydrocephalus, etc.

The rare pulse is an evidence of very severe cerebral disease, especially where there exists great pressure on the organ, as in hydrocephalus, or tumors of the brain. This kind of pulse also exists in cardiac diseases, when arising from any obstruction in the circulation; hence it is found in cyanosis of children.

An intermittent pulse will occur when there is a congenital malformation of the valves of the heart, and in all diseases of the lungs and pleura, where a part of the lungs has become impervious, or the entrance of the air has been prevented. In inflammations and effusions in the brain, and in spasmodic affections, the pulse will become intermittent; and where this peculiarity arises in gastric disorders and worms, it is explained by reference to the derangement of the nervous system.

An irregular pulse is a higher degree of the intermitting. It points out the existence of higher grades of the diseases above mentioned.

An unequal pulse is an unfavorable sign at all ages. It is not very common in young children, but it often occurs in diseases of the brain; and it is also an evidence of obstruction of the circulation, from effusion in the pericardium, or of congenital diseases of the heart.

Symtomy

A strong pulse is an evidence of inflammation and congestion in different organs. A weak pulse is a sign of debility; it also occurs in gangrene, softening, or purulent infiltration.

A full pulse is a sign of plethora; and it is often the precursor of hemorrhages, evacuations, and exanthematous eruptions.

A hard pulse indicates inflammation or spasm. The hard pulse of spasmodic disease is distinguished by its smallness and irregularity, whereas in inflammation it is strong and regular.

The attempts to discover organic affections by the pulse have not been successful. It is of more value to discover the character of the disease in general, and for making a prognosis, than for discovering the seat of the disease.

DISEASES OF THE CIRCULATORY SYSTEM.

CYANOSIS.

Cyanosis is characterized, as its name imports, by a blue appearance of the skin; whence the names of blue disease, puer ceruleus, cyanopathia, as it has been at different times called. It is the blue jaundice of the ancients.

Infants at birth are often cyanosed, from an impervious state of the lungs, or from an inefficient action of the respiratory muscles; it also arises from pressure on the brain, after severe labor. This condition has been already considered in the article on asphyxia of new-born children. The disease now to be considered, is that which persists after the establishment of respiration for an uncertain length of time, even to full adult age. For the most part, children thus affected, if they survive the period of infancy, die soon after they have attained the age at which they commence the use of the most powerful muscles of the body in walking.

Etiology. The causes of this affection necessarily include the morbid anatomy and pathology, for it arises from a congenital malformation, or persistance of the natural fœtal openings of the heart, or of some dilated or thickened state of the right cavities. It is not the blue appearance of the skin, which arises from a peculiar condition of the capillaries, and a stasis of venous blood in the surface, such as is found toward the close of pulmonary diseases, fevers, and the Asiatic cholera.

There have been several dissections, by Corvisart and others, of persons who have been affected with this blue color of the skin, in whom no continuance of the fœtal openings, and a persistance of the partial fœtal circulation, was found to exist—the usual cause of these symptoms. On the other hand, Fourquet, Breschet,[*] and Crampton,[†] have recorded cases, in which a large communication has existed between the two ventricles, without the presence of a cerulean hue of the skin, or the existence of the distressing symptoms usually accompanying an imperfect condition of the heart. In one instance the foramen ovale has been found open even to old age, without much interference to the functions of the body.[‡] The latter are curious exceptions to the general rule, for it can scarcely be conceived that a large quantity of venous blood can be transmitted into the arteries, without interfering in some degree with the functions of the body.

Whenever a cyanosed state of the system exists, unconnected with protracted disease, it results in every instance from a malformation of the heart, by which a portion of the venous blood is mixed with the arterial, or from some condition of the lungs, whereby blood sent to them is not properly changed by the vital and chemical actions, which in a normal condition of the lungs occur in them. In those instances where cyanosis does not take place, and the fœtal circulation in part remains, it is doubtless because the blood passes through the lungs in sufficient quantity to become oxygenated to such a degree, as so render the venous blood, with which it is mixed, sufficiently altered for the purposes of nutrition and growth.

Anatomical examination, however, has established the fact, that the right cavities of the heart are always found altered in size, whether there exists an opening between the two sides of the organ or not; and the livid color of the lips is an invariable sign of lesions in the right side of the heart.

The disease, therefore, does not always depend on an imperfect closure of the foramen ovale, but in the greatest number of instances, especially when accompanied by the symptoms which will be described in the next section, this imperfection doubtless exists. As has already been stated, the persistance of the interauricular opening and arterial duct does not, in the first days of life, produce any very remarkable symptom, nor does it afterward, if the blood is in reality sufficiently oxydized. In general, however, especially if there exists much plethora, and the respiration be imperfectly established at first, from the constant interference of a partial fœtal circulation, the disease known by the name of cyanosis, or peur ceruleus, results from this condition of the heart; for if any alteration from the normal action occurs, by which the heart performs its part in the circulation of the independent being but imperfectly, and fails in transmitting the blood to the lungs, the unchanged venous blood must be sent into the general circulation. That this does occur, appears from the singular case described by Dr. Sandfort. This was a boy, who had been affected with asthma from the second year until his death, which took place in his thirteenth. He was of a leaden color, and known as the blue boy. On making an autopsical examination, the aorta was found to arise from both ventricles, while the pulmonary artery was of so small dimensions as scarcely to admit a probe.* There are several other instances recorded, where the disease was connected directly with openings between the ventricles; the patients living to the sixteenth and twentieth year with great distress.† Dr. Baillie gives the case of a child who lived two months, where the aorta arose from the right ventricle, and the pulmonic artery from the left;‡ in this case, and other similar ones, the color was uniformly blue.‖ A remarkable case of an accidental occurrence of the formation of a passage between the two ventricles, from some injury, as was supposed, is recorded by Corvisart. It occurred in a boy who died at the age of twelve years, and who had not manifested any symptoms of irregular respiration until within five months of the time of his death, when the whole train of distressing symptoms for the first time made their appearance.

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[*] Dict. des Scien. Méd.

[†] Med. Trans. of the Coll. of Phys. in Dublin, vol. i., New Series.

[‡] Geschichte einer Chir., Privatgesellschaft in Kopenhagen. Bertholin. Anal., Lib. ii.

With these remarkable facts, and the similarity of the condition of the heart of a young infant, the distressing symptoms which characterize the disease in question, may, in most cases be attributed to the continuance, in some degree, of the fœtal circulation; and in all, whether it has existed with a malformed heart or not, it indicates an imperfect oxygenation of the blood; for a partial cyanosis may exist in severe congestion of the lungs, when the lips and alæ nasi will become of a livid color.

SEMEIOLOGY.—When a young infant is affected with this disease, the respiration is at intervals very laborious and distressing, sometimes accompanied with loud screams. Immediately after each fit, the face, which before was of a bluish color, returns to its natural hue, and the pulse becomes regular. In a few minutes the respiration is entirely suspended; the eyes are vacant, the hue of the face changes; it is more particularly of a deep blue on the upper lip, while the pulse is extremely irregular. In the course of ten minutes the blueness extends over the whole face; afterward the extremities become blue and cold, and the pulse scarcely perceptible. While in this condition the child suddenly screams, is convulsed, and with two or three sudden inspirations the circulation is again restored, the leaden color disappears, and the skin recovers its natural hue.

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* Observationes Anatomico-Pathologicæ; Lugd. Bat. 1777, quoted by Dr. Good.

† Morgan. de Sed. et Caus. Morb., Ep. xvi.

‡ Morbid Anatomy, Plate vi., p. 21.

‖ Transact. Medico-Chirurg. Soc., Edinb., vol. i., Art. vi., by Dr. Holmes.

Such are the symptoms attending violent paroxysms of the disease in young infants. In others it is not so severe, although in all there is great distress in breathing, on the occurrence of any circumstances which will excite an increased action of the heart. The child will continue for three or four years with the skin completely blue, and without the occurrence of any untoward symptom of a sudden or alarming nature. But when he has arrived at the age at which he commences the use of his limbs in walking, the increase of circulation from this cause embarrasses the heart in its action, and repeated fainting fits are the result. The child thus affected scarcely survives this period of life; but, as has already been stated, cases have occurred where a wretched existence is prolonged, even to puberty and adult age.

Treatment.—In the violent paroxysm above stated, occurring in young infants, and threatening almost immediate death, the object should be to sustain the vital energy of the sinking frame, until the heart has in some degree recovered its tone, from the congestion both in its cavities and in the pulmonary system. For this purpose there is nothing so effectual as a stimulating bath, aided, in severe cases, by a blister to the chest. Dr. Hosack, in the appendix to the American edition of Thomas's Practice, gives the successful result of two cases treated by these means. The children were placed in a bath raised to a temperature a little above the natural temperature of the body, composed of an infusion of Peruvian bark and brandy, with the addition, from time to time, of a little aqua ammoniæ. The violent paroxysms were quickly relieved, and the children recovered.

In the other form, but little can be done besides keeping the child as much at rest as is possible, confining him to a light diet, and preserving the bowels in a soluble condition. There have been instances where the blue skin has gradually disappeared, arising from the natural removal of the organic causes of the disease.

INFANTILE REMITTENT FEVER.

Febrile disorders, of a remitting nature, are of very common occurrence in children, and rank next in frequency to croup, pneumonia, and diarrhœa. The first clear and distinct account we have received of the remittent fever of infants, was written by Dr. Butter, in 1782;* although there exist allusions to a similar affection in children in the works of Sydenham, Sauvages, and Hoffman, under the names of hectica infantilis, and febris lenta infantum.

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* Treatise on Infantile Remittent Fever, by William Butter, M. D.; Lond., 1782.

Etiology.—The predisposition to a remitting form of fever in children arises from the peculiarly irritable condition of the nervous system, by which the circulation is easily excited to undue action, and as quickly exhausted of its accumulated excitement. This condition is more remarkable where an irritative action is present in some portion of the intestinal canal. The irritation of teething, also, often gives rise to similar symptoms. The variations of atmospheric temperature, cold or damp, may occasionally excite the disease. It has at times prevailed as an epidemic, and by some has even been supposed to have been contagious. The sudden suppression of an eruptive disease has not unfrequently been a cause of remitting fever. The excitement, however, of the intestinal mucous membrane is the great source of remittent fever of children; but the immediate exciting cause will appear more at length when the symptoms and pathology are considered: it will on this account be necessarily left to be considered under the section on the pathology of the disease.

Semeiology.—The remittent fever of infants is very slow in its progress, and its first symptom is irregularity of the bowels; sometimes costive, and at other times relaxed. There are several accessions of fever during the day, accompanied with great drowsiness. Dr. Butter makes three different forms of the disease; these he denominates, from the most prominent symptoms, the acute, the slow, and the low infantile remittent fever. The distinction can scarcely be applied to practice, although the varieties unquestionably exist. Without going into the detail of the symptoms of each, it is sufficient to remark, that the difference is found principally in the mode of invasion. Thus, the acute is violent in its attack, and generally preserves more of the inflammatory character during the progress; the slow, although with much the same detail of symptoms, is yet more imperceptible in its invasion; while the low variety is distinguished by the determination to the brain, and the occasional presence of delirium, succeeded by a low, quiet state: the child being indifferent, and at times insensible to surrounding objects.

All the occasional forms of this disease may be comprised in the following symptoms, variously altered, according to the violence of the fever, or the attending complications.

The strength is observed to decline gradually, the abdomen is tumefied, and the breath offensive. One of the most remarkable symptoms is the itching of the nose, which induces the child to be constantly picking or scratching it. The sleep is much disturbed, and he is observed to grit the teeth, and occasionally to start in his sleep. These symptoms are followed by a chill, which is succeeded by fever; first making its attack during the night. Before the fever is fairly established, there are several exacerbations in the twenty-four hours; and during the remissions the child appears almost well. These accessions are at first slight, soon, however, they become more severe, and the intervals short. The exacerbations are then generally about three in number, during the day; the last, occurring in the evening, sometimes continues through the whole night until morning, and is very distinct when the disease is fully formed.

From the commencement there is a total loss of appetite, with foul tongue, and constant thirst. Every symptom shows the digestion to be entirely suspended; and after the disease has continued for a few days, the nausea, which always attends the taking of food, increases, until the child vomits everything it swallows. The intestines, also, lose their power, for the food passes off without any other change than that produced by putrefaction.

During the fever, when the disease is fairly established, the pulse is from one hundred and forty to one hundred and sixty. The skin is dry, the surface of the body hot; but the heat varies in different parts, the abdomen and palms of the hands being warmer than other parts. The thirst is very great, and increases with the increase of the fever; the child drinking cold water with remarkable eagerness. The urine during this time undergoes a change, and is of a clear orange color. While asleep, the child tosses about in a very restless manner. In other instances the head appears to be the most affected part; drowsiness, stupor, and occasionally delirium appear, as the complication of the disease. At other times the complication appears to be in the pulmonary system, as manifested by increased and painful respiration and coughing.

The paroxysms of fever go off with partial sweating, and the symptoms usually abate during the remissions, but do not wholly disappear; and when the fever is severe, the remissions are often almost entirely imperceptible. Although a partial moisture appears, the skin for the most part continues dry, even if cool. In proportion to the distinctness of the remissions, is the relief the child experiences from the peculiar symptoms of the disease, the sleep becomes refreshing, and the child more lively. The exacerbations are milder and shorter, while the appetite returns; and the secretions generally manifest an improved state of the system, the urine becoming turbid, and depositing a sediment of a reddish color, while the stools exhibit a return of the healthy action of the liver; a general moisture, also, takes place over the skin. The pulse loses its extreme frequency, but continues, through convalescence, somewhat above the natural standard.

These are the usual symptoms of the disease, and include the three varieties described by Dr. Butter. Often, however, they are not so strongly marked, and assume a less tangible form; the fever being so slight as scarcely to attract attention, while the debility and protracted indisposition show the progress of a very serious affection, gradually wearing out the vital energies of the system. The symptoms do not differ much from those above described, except that those of the abdominal viscera predominate, and the circulatory excitement is less active. The tongue is more furred, the abdomen more prominent and hard, and the alvine evacuations show a greater derangement of the secretions, being very offensive and irregular in their appearance. There is an obstinate costiveness at first, which is not of long duration, for a severe diarrhœa will occur at times, with every evidence of a great derangement of the secretory functions, the discharges being of a dark brown color in most cases, but in some green, and in others red. In protracted cases the abdomen becomes tender, and streaks of blood are mixed with the fæces, while a severe tenesmus will often attend each evacuation.

In this slow and indistinct variety, the urine preserves the white color peculiar to it at the commencement of the disease, and it is supposed to indicate the presence of the earthy phosphates, and is an evidence of a broken-down constitution. This appearance of the urine is described as very common by all the European writers. It is not of so invariable an occurrence in this country, for it would seem that the affection generally is of a more active nature here; and this symptom, with others, indicating a preternaturally bad condition, giving a peculiar type to the fever, is not here of so frequent occurrence as it is described to be in Europe.

In general the disease is easily managed, and the prognosis is favorable, unless a complication takes place of congestion of the cerebral organs. When the remissions evidently become longer, and the appetite returns, the child may then be considered as convalescent. A lessening of the intervals, together with an increased swelling of the abdomen, may be regarded as affording an unfavorable prognosis.

The most unfavorable symptom of infantile remittent fever is the cerebral affection, which almost invariably terminates in hydrocephalus. The diagnosis of this disease from the first stage of hydrocephalus is one of great difficulty; and so closely do the diseases resemble each other, that they almost appear identical. One of the most remarkable signs of the cerebral affection is the screaming and starting in the sleep, and the throwing of the hands over the head, and the constant attempt at bending the head backward. There is also a great intolerance of light, and an evident affection of the intellect, together with strabismus. The child also swallows food without apparently discriminating its nature. In the disease now under consideration these signs of cerebral derangement do not exist; there is no intolerance of light, no particular pain in the head, nor strabismus; but, on the contrary, abdominal symptoms prevail, and the appetite is so entirely lost, that there is no disposition left to take any kind of food. The alvine evacuations are very dark colored and offensive, not having the odor of fæces, but of putrefaction. Sometimes convulsions arise, which may bear some resemblance to idiopathic cerebral disease; but when they cease, the intellect of the child is perfectly restored. The state of the circulation, also, is different in these two diseases: the remittent fever having no distinct stages, the pulse is more uniform throughout, and never falling below the natural standard.

Dr. Golis is very minute in the diagnosis of this disease, or worm-fever, as it is denominated by him.* The disease, according to this distinguished writer, attacks children of a phlegmatic temperament, with large bellies, and exhibits well-marked remissions: the face is swollen, and there is a general appearance of stupidity and sluggishness. In hydrocephalus all the distress is referred to the head, or rather alternates with the abdomen and pain in the limbs. He is unnecessarily minute in some of his descriptions, and the number of points of distinction rather tends to confuse than assist the diagnosis. The accurate designation is not of so much consequence as it would appear to be by the pains bestowed on it. The termination of remittent fever by effusion in the brain, being the probable termination of the disease when fatal, it should be the duty of the physician in every instance to keep in mind this tendency of all diseases, and especially the one in question in children, and be ready to meet the symptoms of turgescence or inflammation of the brain when they arise. When this is constantly borne in mind, the necessity of an accurate diagnosis is rendered of little moment; and indeed these minutiæ are often of very little consequence, and tend too much to absorb the mind, and to draw it off from the consideration of the main object of medical practice. It is sufficient for us, when there is great difficulty in accurately forming a diagnosis, to keep in view the strong and probable tendency of the disease; to be on the watch for the appearance of such symptoms as give the disease its fatal character, and either anticipate them by the timely administration of remedies, or remove them, when they arise, by the energetic application of such means as the nature of the case demands.

Morbid Anatomy and Pathology.—Dissections have furnished but little light on the morbid condition of the system in remittent fever; for on a fatal termination, the transmission to the brain is the ordinary course of the disease; and effusion of serum in the ventricles will be all that will be found remaining of the disease, which at its commencement indicated but little more than derangement of the primæ viæ. Pemberton discovered, in one case, the intestines very greatly distended, and the mesenteric glands much enlarged, without any signs of inflammatory action having existed in any part of the bowels, or in any of the abdominal viscera, or without effusion in the abdominal cavity.*

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* A Treatise on acute Hydrocephalus, etc., by Leopold Anthony Golis; translated by Robert Gooch, M. D.: London, 1821, p. 46, et seq.

The occasional appearance of worms in the alvine evacuations of children affected with remittent fever, has led to the belief that it was owing to their presence in the intestines that the peculiar symptoms of remittent fever occurred; and even where their presence was not discovered in the fæces, the morbid secretions were regarded as dead and broken worms; a notion which is still extensively popular.

The idea of the presence of worms in the bowels as a cause of fever, was very prevalent during the last century, and was adopted by Baglivi to explain most of the diseases of children. Sauvages and Hoffman also entertained the like notions with respect to the causes of these febrile affections, such diseases being known by the name of febres verminosæ.

The contrary opinion has been maintained by several distinguished practitioners, and the errors which have so long prevailed, in considering the disease as dependant on the presence of parasitical animals, have been pointed out. Dr. Musgrove showed that these affections did not arise from worms, but from irritating matters, or saburra in the intestines.† Dr. Clark, also, particularly refers to the fact that the remittent fever of children is rarely, if ever, cured by anthelmintics.‡

From the deep research and the philosophical acumen it displays, Dr. Butter's treatise is the standard to which all reference is made at the present day. It is unquestionably the most complete essay on the subject, and the most in conformity with experience, both as to the ordinary appearance of the disease, and from the success of the treatment pursued by him, and which is the foundation of that adopted now. He does not regard worms as in any way essential to the disease, but refers all the symptoms which mark the disease, in almost every instance, to a debilitated state of the digestive organs, and to the accumulation of unhealthy secretion in the bowels, connected with the peculiarly sensitive condition of the infant state. Dr. Marsh‖ adopts a similar opinion, regarding the disease as arising from a deranged state of the gastric organ, and from a morbid action seated in the mucous membrane of these parts.

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* A Practical Treatise on the Diseases of the Abdominal Viscera, by Christopher Robert Pemberton, M. D., F. R. S.; London, 1806.

† An Essay on the Nature and Cure of the (so called) Worm-Fever; London, 1776.

‡ Observations on Fever, etc., by John Clark, M. D.; London, 1778.

‖ Dublin Hosp. Reports, vol. iii., p. 316.

This appears to be a very correct view of the disease, when the group of symptoms is taken into consideration; when the morbid action is regarded at times as extending to the appendages of the intestinal tube.

The affection of the mucous membrane may exist in different degrees in various cases, which difference is not always to be ascertained. It can not be regarded as being, in every instance, a state of inflammation of this membrane, as is usual to consider it in France, although such a condition will unquestionably arise during the progress of the disease. At first the affection of the mucous membrane is one of simple irritation, as I have frequently seen occurring suddenly from the ingestion of some irritating and insoluble substance; the fever disappearing when it was removed. In one instance, where an infant suffered for some days without my being able satisfactorily to ascertain the cause, free and copious vomiting came to its relief, when a large mass of caseous matter was discharged, to the entire abatement of all the symptoms. This, and other instances, afford a satisfactory proof of the relation subsisting between infantile remittent fever and a simple irritation of the gastro-intestinal surface, without any inflammatory action being in every instance established.

Besides irritation of the mucous membrane, the symptoms, in most instances, point out a depraved state of the secretions, which does not necessarily depend on the phlogosed state of the mucous membrane; and the success of such measures, which will slightly alter or modify the secretory action of the gastric and intestinal mucous membrane, is much greater when there exists equivocal evidence of the inflamed state of the part, than the constant and sole employment of antiphlogistic and demulcent remedies.

Dr. Joy considers it as a variety of gastric fever, modified by the irritable constitution of infancy, and closely allied to the febris pituitosa of Frank.*

From an examination of the opinions of the various authors, compared with some amount of experience in the disease, remittent fever appears in general to be a symptomatic disorder, from derangement of the stomach and intestines, or of the appending viscera; or from an irritative action, at first excited in the mucous membrane of these parts. It has been observed that almost all fevers connected with gastric derangement assume a remittent character. This disposition, added to the irritable constitution of young children, gives their febrile affections this peculiar type. When there exists any severe local inflammation, the fever is less likely to assume this character, from which it is evident that it is one more of irritation than inflammation.

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* Cyclopædia of Pract. Med., Art. Fever.

TREATMENT.—The treatment must, of course, be regulated according to the existence of the symptoms, from which we are to judge of the immediate cause of the fever. It is evident that in some cases it is a disease arising from simple irritation of the mucous surface of the stomach, from the presence of indigestible food, which ought to be promptly removed by some mild emetic. There is a difficulty often in ascertaining whether there exists this irritating cause alone, and independently of disordered action in the viscera. It may, however, be suspected, when it has arisen suddenly in children who have passed the period of lactation. In those at the breast, it is almost always a matter of difficulty to ascertain the existence of indigestible matters irritating the tender mucous membrane. This irritating cause is often a long time gradually accumulating, and for the most part consists of the alteration of the milk, and the formation of a mass of cheesy matter, and until the removal of which, the symptoms of fever will obstinately continue. Where there is reason to believe the presence of irritating matter of this nature, a gentle emetic will be needed to remove it; a measure which can not be attended with hazard, where there exists no tenderness of the stomach on pressure, and when the other signs of gastric inflammation are wanting. Should a doubt exist on this point, the treatment may be commenced with a dose of castor oil, and the administration of enemata, with warm stupes to the abdomen.

In this disease, as there usually is much disordered action of the liver, and an entire alteration of the secretory functions of the bowels generally, it will be necessary to give at first some more powerfully active remedies, which will produce an altered state of the secretions, especially of the liver. It is usual to prescribe calomel, in combination with jalap or rhubarb, or calomel alone, and promote its operation with an infusion of senna. Where the irritation is confined exclusively to the abdomen, and the foul breath and furred tongue give proof of the congested state of the liver, and general derangement of the secretions, this course is unquestionably the most proper; the operation of calomel with other purgatives being the most effectual, and the most prompt in the removal of the derangement on which the febrile action depends. Where, however, there is much fever, and especially a determination to the head, as hydrocephalus is almost an invariable termination of the disease, it is thought by Dr. Hosack to be inadmissible, from the increased arterial excitement caused by the use of mercury.* His remarks appear to be more applicable to the disease, when caused by teething, or when it is complicated with this process. The existence of hydrocephalus is much more prevalent, according to the opinion of Blackall, Pemberton, and Willis, since the indiscriminate use of mercury in the affections of children.

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* Op. Cit., p. 332.

If the abdominal viscera are those most deranged, the use of mercury as a prompt cathartic can scarcely be dispensed with, for there is no article of the materia medica which exerts so general an action on the digestive organs, and which is so often followed by an improvement of their secretory functions. The employment of so active an agent is clearly indicated at the commencement, when the premonitory symptoms—those of irregularity of the bowels, or total failure of the appetite, and a fœtid state of the breath—show an altered and morbid condition of the secretions. Experience abundantly confirms the opinion here advanced, that it is on purgatives that we must rely at first, where this morbid condition of the alvine discharges and urine, and swelling of the abdomen, are the most prominent symptoms; for the gradual disappearance of the fever will almost invariably follow the use of mercurial purgatives under these circumstances.

Dr. Hosack advises, in the place of calomel, an infusion of senna, combined with super-tartrate of potash and manna, where symptoms of hydrocephalus show themselves, as a purgative, which he has used with the most decided advantage.* To prevent this termination, he advises an open state of the bowels, and a free use of antimony, to unlock the surface of the body, together with warm bath and blisters, to create a new and relatively safe seat of irritation.

The combination of calomel and antimony is highly useful in relieving the bowels, and controlling the febrile action when the latter runs high; and may in some degree remove the objections above made to the use of mercury at all in this disease. James's powder may therefore be advantageously given in this disease, combined with calomel, in the dose of one to five grains, or with the hydrargyrum c. cretâ, when there is a tendency to inordinate action of the bowels. This was a favorite course with Dr. Cheyne, in infantile remittent fever, especially when the sensorial functions were affected, and hydrocephalus apprehended. His practice was to prescribe a pill of calomel and antimonial powder three times a day, interposing between every two pills a moderate dose of a common purgative mixture. To persevere in the use of purgatives is not unattended with danger, for the action of these articles themselves becomes a source of irritation; our object being simply to remove the excessive accumulation of undigested matters and morbid secretions, and by stimulating the mucous membrane, excite it to a healthy action. Carried beyond this point, purgatives are decidedly injurious. Upon the appearance of severe local congestion, with high febrile excitement, blood-letting, either local or general, will form a necessary part of the treatment; and often a small quantity of blood abstracted, on the appearance of the symptoms, will allay the fever and arrest the local disease.

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* ℞ Fol. Sennæ,
Potassæ Sup. tart.,
Mannæ, ãã. ℥ss.

Infuse in half a pint of boiling water. A wineglass every two hours, according to the age of the child.

It will be necessary, however, to preserve the bowels open, by the use of mild aperients, so that there may be two or three evacuations in the course of twenty-four hours. Dr. Butter was in the habit of using sulphate of potash for this purpose, or some of the other neutral salts, from their acting on the kidneys as well as on the bowels; while the febrile action is at the same time allayed, as he supposed, by their operation on the nervous system, especially by the sulphate of potash. Be this as it may, it is unquestionably an admirable medicine for children, as a deobstruent and cathartic. It appears to exercise a stimulating effect upon the liver and pancreas. Dr. Fordyce used it as a favorite alterative cathartic in visceral obstruction in children, where there existed a swollen abdomen and defective digestion. It is usually used in combination with rhubarb,* or it may be used in a solution, uncombined with any other cathartic, as used by Dr. Butter, in the proportion of a drachm to four ounces of sweetened water, of which a teaspoonful was given every hour, to a child of five years. When it had operated sufficiently on the bowels, he was in the habit of substituting the nitrate of potash; and if a diarrhœa existed, five grains of the extract of conium were dissolved in four ounces of water, and taken in the course of twenty-four hours. The rule for giving the conium, was a grain daily for every year of the child's age. The advantage of this medicine is the combined effect it had, both of relieving the fever and controlling the diarrhœa. Sydenham's practice was, to give rhubarb in infusion, so as to act as a mild aperient, depending chiefly on this course for the management of the affection.

When the disease is protracted, a continued use of hydrargyrum c. cretâ may be necessary to restore the secretory function of the liver, either combined with rhubarb, or used alternately with it, where it is deemed necessary, at the same time to procure an evacuation from the bowels every day. Where the contrary condition exists, the hydrargyrum c. cretâ may be used alone.

In case evidences of inflammatory action of the mucous membrane appear, and the abdomen becomes tender on pressure, and the stools contain streaks of blood, mucilages in some form will be necessary, while the bowels are kept open by mucilaginous enemata, occasionally containing a few drops of laudanum, if the tenesmus be severe.

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* ℞ Potassæ Sulph., gr. x.
Pulv. Rhei., gr. v.
Pulv. Sacchar. Alb., gr. x. M.
Twice or thrice a day, for children above the age of six years.

In every case it will be necessary to examine the condition of the gums, and if they are swollen, to cut them freely down to the tooth; this, together with some mild aperient, when the fever depends on this irritation, will remove all the symptoms.

Where there is great debility and the disease is long continued, it may become necessary to administer some tonic medicine; and sulphate of quinine will be found the best for this purpose. But the early use of such remedies as has been advised by some practitioners, can scarcely ever be found of any advantage; on the contrary, the symptoms will unquestionably be increased from the use of tonics and stimulants, if given shortly after the commencement of the disease, even if evacuations are used as preliminary steps in the treatment.

NATURAL FUNCTIONS.

DIGESTIVE SYSTEM.

PECULIARITIES OF THE DIGESTIVE SYSTEM.

The digestive organs of man, in a state of infancy, are of great simplicity, when compared with their condition at any other period of life. They possess fewer parts than those of adults, as their office is of the simplest kind. The food of the infant not requiring mastication, there exist no teeth; its simplicity rendering its mixture with the salivary fluid unnecessary. The glands supplying this fluid are, in early infancy, found to be of very minute size, and exercise no functional activity. When the teeth first appear, and during the period of dentition, these glands are in a state of great activity; hence the quantity of saliva so often seen to flow in children that are teething, which, while it shows the simultaneous development of the salivary glands and the appearance of teeth, affords also an outlet for the accumulation of blood, when there exist great irritation and congestion from increase of functional power.

Man, at the earliest stage of his life, differs from his condition in after life, in not being omnivorous. Nature has provided for him but one kind of food, and the slightest departure from the use of nature's nourishment would be to hazard the health and life of the young being. Should it become necessary to substitute any food for the mother's milk, that which has the greatest resemblance to it, both in consistence and quality, is the only one that can with safety be used. Milk is the sole food provided for his sustenance until the time when a change in his system takes place, when a new arrangement of his organization enables him to receive nourishment from other substances.

The appearance of the first teeth indicates the time when a change may be made in the nature and consistency of his diet, as they point out the ability of the child to use his efforts to separate the coherent particles of his food. Farinaceous articles may be made to form an addition to his aliment; and in proportion to the appearance of the remainder of the teeth, its variety and solidity may be increased.

The rudiments of the teeth are seen in the fœtus of the second and third month, and are at first in the form of a double sac. A pulp of vascular and nervous matter is formed at the bottom of this sac, surrounded by a transparent fluid, which disappears as the pulp enlarges. Ossification first appears on the upper part of this pulpy substance about the end of the third month. The enamel is not secreted until some time afterward.

The alveoli are formed by the groove which runs along the edge of the jaw, and by its intersection, from the growth of osseous matter which extends from side to side.

The crowns of the molars and incisors are generally completely formed and ossified at the time of birth. The ossification of the roots does not occur until afterward, by which process, and by the alteration of the form of the alveoli, the tooth is crowded upward, and absorption of the gum follows the pressure. The tooth at length makes its appearance above the gum.

The teeth sometimes appear as early as the fourth month, while in some children that are of a delicate and feeble constitution, they do not show themselves until the end of a year; and it has happened in some cases that the first tooth has not appeared until the fourteenth month. The process of teething is generally completed before the second year, but it has occasionally been protracted beyond that period, apparently depending on the vigor of the child.

As a general rule, however, the teeth first protrude about the sixth month, and appear in the following order, except in a few anomalous cases: The two middle incisors of the lower jaw, the two corresponding ones in the upper; next the two lateral incisors of the lower jaw, which are followed by the two corresponding ones in the upper jaw; the two cuspidati of the lower jaw then show themselves, succeeded by the two corresponding ones in the upper jaw; and, lastly, the two molars in the same order as the preceding; and about the fourth to the sixth year appear four other molars, which remain permanent, making in all twenty.

Although the teeth are generally developed in the order above stated, yet there have been many exceptions. Sometimes the upper middle incisors, or lower lateral incisors, appear first; the cuspidati, and very rarely the molars, have been known to protrude first, and in some cases, have been known to appear all at once. Pliny, Colombo, Marcellus Donatus, Van Swieten, and others, have given us instances of these anomalies. Louis XIV. was born with six teeth, and the celebrated orator, Mirabeau, had at birth two molars. On the other hand, there have been instances where they never appeared, and what is remarkable, instances of this have sometimes been hereditary.

The jaw of a child grows but little after the first set of teeth are completed, and the peculiar plump form of the face of infancy continues until the first permanent molars have appeared: and at the end of seven or eight years, the jaw begins to lose its circular appearance, and the face consequently assumes an elongated appearance.

In children of a healthy constitution, dentition proceeds without much disturbance of the system; it is strictly a process of development, and therefore may, in the greatest number of cases, be left to the resources of nature. Heat and tumefaction are first perceived in the gums, when the teeth are about to appear. The first teeth, however, which are the incisors, very often show themselves without any previous manifestation of their approach. There is an instinctive desire for the child to press and bite the nipple, fingers, and almost everything presented to its reach, probably from the itching attendant on the sanguineous turgescence of the part. Saliva flows abundantly in most cases, and greatly relieves the congestion of the parts surrounding the teeth.

The second set of teeth gives less disturbance to the system than the first, and the effects, from the protrusion of the teeth, are purely local.

Children usually shed their teeth at about six or seven years of age; and the permanent set make their appearance in the following order, occupying about five years in its completion: The middle incisors of the lower jaw, then those of the upper; next, the lateral incisors and anterior molars; the lateral incisors of the upper jaw then show themselves; the anterior bicuspides protrude about the ninth year, and the posterior, about a year afterward.

The cause of the shedding of the temporary teeth, is the disappearance of the branches of the artery supplying them with nutrition; the roots and the sockets are then removed by absorption. The whole of this is probably effected by the growth of the jaw, which at this period assumes a new shape, thus crowding and obliterating the artery and nerve, and thereby obstructing the flow of blood to them, causing them to perish for want of nutrition.

The salivary glands are quite small until the period of dentition, when they assume a considerable size, and secrete an abundance of fluid. They have a magnitude proportionate to the complexity of the digestion; hence they are always smaller in carnivorous animals than in those living on vegetables; and during the infant state, when the food is remarkable for its simplicity, they are scarcely to be seen. During the period of youth these glands are fully developed, and, indeed, possess more than their ordinary supply of blood; and for that reason are, at this period of life, more predisposed to disease.

The mucous glands of the stomach and intestines are also very small before the eruption of the first teeth, agreeing in this respect with the salivary glands; a general development of every part concerned in digestion taking place at this period, either to furnish fluids for the assimilation of a new species of food, or to supply a lubricating fluid for the protection of the tender mucous surface from its irritation.

At this time of life the mucous membrane of the entire intestinal canal, including the fauces, pharynx and stomach, is covered with villi, and is highly vascular and sensitive. Hence the importance of confining the child to the mild and unirritating food provided for it by nature.

The small intestines are much longer in proportion than in the adult, and are about a third more in length, when compared with the entire length of the whole canal: the large intestines are longer in proportion to the small. The valvulæ conniventes are scarcely apparent, the vermiform process is very long, and the cœcum is very largely developed. The cœcum and colon do not present their depressions and prominences in so distinct a manner as in adults.

The digestive passages are filled with a quantity of mucous during the first year, varying in color and consistency in different parts of the intestinal canal. In the duodenum and jejunum it is thick, white, and very adherent. Sometimes it is colored yellow by the bile. The large intestines are always at birth filled with thick, pitchy, deep green meconium.

There remains in the intestines, after all the liquid matters have been removed, a layer of condensed mucus, adhering closely, like a plastering, to the mucous membrane, capable of being raised like a continuous membrane; this will separate of itself, and is seen in the fæces in the form of small white floculi.

The liver of an infant at birth fills almost a third of the abdominal cavity, descending even to the crest of the ilium. On the change of its circulation and obliteration of the umbilical vessels and ductus venosus, the left lobe diminishes, the vena portæ is developed, and the secretion of bile occurs in abundance.

The color of the liver changes to a darker hue as life advances; and its size diminishes, when compared with the size of the individual; but there have been instances where the size of the organ remained through life in the same proportions as in the fœtus.

The liver is nearly in the middle of the abdomen, with its anterior border near to the parietes. It ascends about the fifteenth year, so as to be entirely within the ribs when the child is recumbent.

The gall bladder is quite small at birth; it soon grows, and contains green, bitter bile, which, however, is less viscid than at a more advanced age.

There has been nothing worthy of remark observed in the spleen. No alterations in its form have been noticed, except such as may arise from disease.

The anatomical characters of the abdominal viscera differ also with respect to their relative position, arising from the relations which the boundaries of the cavity have to each other. Thus, the distance from the sternum to the pelvis, in a new-born child, is nearly the third part of the length of the body, while, in the adult it is about one fifth. The middle part of the abdomen, also, is more developed at the period when the distance is the greatest. The spine, also, being less curved at this period, it is deeper from the anterior to the posterior part. The pelvis being much smaller in children, and the sacrum being considerably curved forward, the capacity of the pelvis is comparatively smaller than at a later period of life; consequently the abdominal viscera are confined to the middle of the belly, until the growth of the pelvis and the enlargement of the ribs superiorly, which take place in the process of general development, increase the space for the lodgement of these viscera.

The stomach reaches nearly to the navel, and lies almost perpendicularly, with its great curvature obliquely toward the left side, and the smaller toward the right. The omentum, therefore, is situated more toward the left; a fact of some practical importance, for it might be mistaken for an obstruction in the colon.

The duodenum is almost entirely behind the stomach; and the whole volume of the intestines is situated much higher than in the adult. The spleen, which in the adult is on the left side of the hypochondrium, can be distinctly felt under the short ribs, toward the middle of the abdomen.*

After the first year, the organs of digestion do not differ greatly from their condition in the adult state; and the presence of teeth, and the activity of the salivary glands, show that the stomach may receive with advantage different kinds of food, which at an earlier period would have been productive of great disorder of the digestive organs. Although a variety of food may be used in early childhood, it is evident, from the condition of the organs for mastication, that food of the softest kind should still be used, that is to say, until after the completion of the eighth year; for until that period the power of mastication is but feeble.

Digestion is a process of great activity in all children at every age—the constant growth of every part of the body demanding a continual supply of nourishment. This process, however, ceases to be so active in proportion as the child advances in age; and the food becomes more stimulating, when the secretions more closely resemble those of the adult, and the fæcal matters require to be less frequently voided, and are no longer passed independently of the will.

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* Analekten uber Kinderkrankheiten, vol. i., p. 51; Stuttgard.

The first process in digestion in the stomach of an infant is, the coagulation of the milk, as is seen to be the case when an infant throws up the milk shortly after sucking. The next is its solution, by the peculiar secretions of the stomach, liver, pancreas, and intestines; but of the process we have a very imperfect knowledge, and are still unacquainted with the immediate part performed by the various glands.

When considering the peculiarities of the physiology of children, and especially those which are connected with that part which performs so important an agency in their economy as digestion, we are struck with that peculiarity, which, at first sight, would appear to be a serious interruption to the process of digestion and nutrition—the vomiting which so frequently occurs in infants. We might be apt to consider it as a disease of the most serious character, connected as it is with the first step in the progress of the all-important function of assimilation—a function so intimately connected with the growth of the child. But when we watch more closely, we constantly see infants discharge the contents of their stomach without any inconvenience resulting from it, even though the vomiting may be repeated several times a day; and far from exhibiting any evil which might be supposed to result from thus frequently vomiting their milk, they actually appear to thrive, and the most robust children appear to be those most commonly affected with this species of vomiting.

It is doubtless connected in some degree with great irritability of the stomach, arising from the congested state of the mucous membrane of the whole intestinal canal, by which it is predisposed to act in relieving itself of the superabundance of aliment; but from the absence of nausea, it would appear to depend on some other cause than either a condition of the mucous membrane of the stomach, or on an extrinsic exciting cause, the ordinary sources of vomiting, both in older children and adults. Professor Schultz,* in an ingenious essay, refers it to the different form of the infant and adult stomach; the former bearing a greater resemblance to that of carnivorous animals that vomit with great ease.

Before stating in what this difference consists, it should be observed that his views, and which appear to be the most in accordance with the ordinary facts which occur in our every day experience, are adverse to the opinions of Boyle, Van Swieten, and to the deductions of Magendie, in later times, that the stomach is passive in vomiting, and that its evacuation is effected by the contraction of the abdominal muscles and diaphragm. If, as maintained by them, the action of these muscles was the only cause of vomiting, it ought to be purely voluntary, which it is well known is not so, except in very rare cases; and which, on that account, are regarded as curious instances of departure from the ordinary physiological condition of man. Vomiting, therefore, can not be the act of these muscles alone. The movements of the stomach, like those of the intestines, are of a very gentle character, and are in strong contrast with the convulsive action of the powerful muscles, which are in full force during vomiting, especially during the experiments which are made to ascertain the action of the different parts. On this account, probably, the French experimenters concluded that it was perfectly at rest, and free from movement of any kind, there existing no convulsive motion in the stomach, its action being of the ordinary and almost imperceptible movement natural to it. These muscles, therefore, not being the cause of vomiting, the doctrine of the older physicians of the antiperistaltic motion of the digestive organs, comes in to explain it. The existence of both these motions at one and the same time, is evident from the occasional effect of cathartic medicines, which, when about to produce the alvine evacuation will also cause vomiting. Fœcal vomiting is also an evidence of the existence of an influence other than abdominal pressure, and proves the operation of the antiperistaltic motion from the large intestines, to the cardiac orifice of the stomach.

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* Hufeland's Journ., März, 1835.

The form of the infant's stomach explains the cause of the frequent and easy vomiting, it being much more conical than that of the adult, and resembles more the shape of the stomach of carnivorous animals. Professor Schultz remarks, that the œsophagus is inserted into the fundus at the left extremity, and at a distance from the pylorus. In the adult stomach the œsophagus is not inserted into the left extremity, but in the middle, between it and the pylorus, which is drawn toward the cardia, bringing both parts very near each other. The small curvature, therefore, in the adult, is very short, while in the infant it is comparatively long, and the large curvature is but little developed: this latter part in the adult is of great size, forming four fifths of the entire circumference. In the infant the fundus loses itself gradually in the pyloric portion; in the adult they are separated by a sort of contraction, more or less marked.

From this arrangement of parts it will be seen how easy vomiting is effected in young children, as the food is equally propelled by the motion of the stomach to both extremities, and the situation of the œsophagus at one of them causes it readily to receive the food. On the contrary, from the great size of the large curvature in the adult stomach, the contents of this viscus are not in like manner equally propelled to both extremities, but are principally confined to that extended cavity, and are moved rather in a rotary manner; the contraction above mentioned arresting them in one direction, and the situation of the œsophagus preventing their passing in the other. Hence the difference in the vomiting of the adult and infant—in the latter easily effected, often without much general commotion; in the former, not produced without the powerful aid of the diaphragm and abdominal muscles. This illustration receives confirmation from comparative anatomy; dogs and cats, where the stomach is of a conical form, and bears a close resemblance to that of an infant, vomit with great ease, and even throw up pieces of food, or a bone, if swallowed in an inconvenient manner. In the horse, rabbit, or hare, where the stomach is of the kind more resembling the stomach of an adult, with a large circular development of the fundus, vomiting can not be excited even with the strongest emetics.

The cause of the difference in the form of the infant and the adult stomach, is doubtless the nature and quality of the food at these different periods of life. The cylindrical form continues only while the child is fed on milk, a purely animal food; and as it uses vegetable food the fundus greatly enlarges. Professor Schultz has shown, in illustration of this, in another work,* that the stomach of carnivorous animals, dogs and cats, will assume a circular form, after they have been fed on potatoes, bread, and other similar vegetable articles; but that it will retain its conical form if they are fed on animal food alone. The round stomach of domesticated carnivorous animals is never seen in wild animals of the same class.

The reason of the greater development of the fundus by the use of vegetable food, is owing to the greater difficulty of its digestion, and its long retention in the stomach before it is propelled into the intestines. The food is moved in the stomach in a rotary manner, and the digested portion is gradually separated, while the undigested mass still requires the motion and agitation necessary to its perfect digestion. In carnivorous animals, the food, soon digested, passes directly toward the pylorus, and being in a smaller mass, and not requiring much agitation for the separation of its nutrient part, but little development of the fundus takes place.

Nutrition is performed with great activity in all children, especially in infancy; for however defective may be the organs of relation, those which are essential to his nutrition and growth are in a state of perfection, at least so far as they are adapted to the food provided by nature, even at the earliest period of his life. The growth, through infancy and childhood, is evident both in the organs in particular, and in the body at large. These changes exhibit themselves more to our senses in the organs of animal or relative life, than in those of the organic functions. These will be more particularly considered, when we come to consider the development and growth of the cerebro-spinal system.

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* De Alimentorum Concoctione.

A male infant, at birth, weighs about one pound and a half more than the female, and is about an inch longer; the growth of the female is less than that of the male, but she is more rapid in the development of her organs. During the first year, the increase in stature is about eight inches; it becomes less rapid toward the fourth year, but increases with great regularity after that period.

The growth of children is a great source of disease, from the derangement of the balance of the various functions, so likely to ensue on the application of any cause which will arrest the development of any part of the body, as is seen in almost every child. An unusual growth of the brain will cause great liveliness of character and intelligence, while the cause of this precocity will predispose the child to convulsions, on the application of any cause which may derange the circulation in that organ. In others, the sanguineous and muscular systems preponderate. Here the face will be found florid, and the general frame vigorous; the child will be strong and active, and much disposed to inflammatory diseases or hemorrhages, arising from similar derangements in the capillary circulation. In others, again, where the lymphatic temperament prevails, obstructions in the growth and development of these organs, will produce glandular swellings and ulcerations of the glands.

As the child advances in life, the organic gradually cease to be the predominating organs, being replaced by those which constitute him an individual in the great family of intelligent creatures.

SIGNS OF DISEASE FROM THE DIGESTIVE ORGANS.

A white coating, of a curdy consistence, on the tongue of infants, denotes acidity of the primæ viæ; indeed, all the phenomena exhibited by the secretions on this organ are sympathetic, and, in general, indicate diseases of the intestinal canal and lungs, from the membrane covering the tongue being a continuation of the mucous

Symptoms

membrane of these organs. White points and aphthæ are sometimes idiopathic, but in most cases show a deranged state of the stomach and intestines. An enlarged tongue may be occasioned by hypertrophy, inflammation, or congestion. Swelling of the tongue in croup, measles, variola, or pulmonary inflammations, is an unfavorable symptom. A soft, moist, tongue, of the natural size, affords a favorable prognosis. A pale color of this organ is a sign of great debility and sinking. A red tongue indicates a violent inflammation of the intestinal tube, and is mostly present in exanthematous diseases, especially in scarlatina. A tremulous motion of the tongue is an evidence of great nervous disturbance; but if it occur in chorea, it ought not to be regarded as a dangerous sign.

Grinding of the teeth often occurs in children without any disease; but if it occur in children who never evinced any such symptoms before—if it occur with starting from the sleep—if it be accompanied by great brightness of the eyes and flushing of the cheeks, there is reason to apprehend convulsions. It occurs in worms in the intestinal canal, and in cerebral affections.

Increased secretion of saliva takes place in irritation near the parotid gland, or in the cavity of the mouth, in stomatitis, dentition, or tonsillitis. Diminution of saliva, with violent insatiable thirst after the continuation of acute diseases, is an unfavorable symptom.

Redness of the throat is a sign of inflammation, both idiopathic and symptomatic, as in scarlatina, measles, and in chronic inflammation of the digestive or respiratory organs. Difficulty of swallowing arises from inflammation or swelling of the pharynx, œsophagus, tonsils, tongue, or parotid gland, ulcerations in these parts, or polypi in the pharynx and œsophagus. Coughing, after swallowing, indicates an inflammation of the larynx; but this coughing should not be confounded with the strangulation and coughing arising in infants who receive their milk with more rapidity than they can swallow.

When a young child drinks often, and with eagerness, and if the mouth be hot and dry, it is very evident that a febrile condition of the system is present. Sometimes children drink with so great avidity that there is scarcely time given to breathe; they are soon obliged to stop, respiring with a loud noise. Where there is an affection of the larynx, as before observed, a cough ensues; and where the affection is severe, or extends to the lungs, the child cries; and in those who have arrived at an age at which they can exercise their intellectual faculties, upon experiencing the distress produced by drinking, will obstinately refuse all drink. Insatiable thirst, in long-continued affections, is a very unfavorable sign: the agonizing eagerness with which a young child will seize and swallow any kind of drink in protracted affections, almost always precedes dissolution.

Symtoms [illegible] [illegible]

The continuance of a healthy appetite in chronic affections is a favorable symptom. When it is morbidly increased, it arises from some irritation in the stomach, but more especially from the presence of worms in the intestinal passages. An inordinate appetite, at the beginning of acute diseases, is an unfavorable sign; so is it after the subsidence of the active symptoms, if the strength of the child does not return.

Loss of appetite, in acute diseases, is no unfavorable sign. If it occur in chronic affections, it is an evidence of great debility, and affords an unfavorable prognosis in children, where nourishment and growth are the most prominent and active functions of the system. Loss of appetite is a constant symptom, where disease of the digestive passages exists in the stomach, but less constant when the affection is in the lower intestines.

Loathing of food, when arising from the condition of the mucous membrane of the stomach, is one of the usual phenomena of acute diseases, and is therefore not unfavorable. It is generally an attendant on a phlogosed state of the mucous membrane of the intestines, and affections of the pancreas, spleen, liver and mesenteric glands. There is occasionally loathing of food when there are worms in the intestinal tube, or inflammation, ulcerations and indurations of these organs. In chronic diseases, protracted loathing is indicative of organic changes in the digestive organs.

Vomiting, in nursing infants, often arises from the stomach receiving more than it can contain, and which, if not thus rejected, would be a cause of indigestion and colic. Vomiting may also be a sign of affections situated in remote organs, as the head, kidneys, and neck of the bladder. It may also arise from acidity in the stomach, or from the presence of some acrid or other deleterious substance, and when painful, is an evidence of inflammation of the œsophagus or stomach. In new-born infants it occurs in obliterations or obstructions in some parts of the œsophagus or intestinal canal.

Vomiting is favorable if it follow simple repletion, and if the child, when old enough, expresses relief from the loathing and nausea, and if the fur on the tongue becomes loose, the skin moist, and pulse soft.

Vomiting is unfavorable if there is no relief from the previous oppression; and if the epigastrium becomes painful, it is an evidence of the existence of inflammation. If protracted, of some organic change, or is symptomatic of hydrocephalus, or some remote affections.

Young children not unfrequently vomit a caseous substance, apparently formed from their milk, when the previous symptoms of distress, colic, fever, etc., disappear. Green substances vomited,

Symptoms [illegible]

not bile, are evidences of a gelatinous softening of the stomach, and is decidedly a bad symptom.

The discharge of gas from the intestines occurs where the digestion is weakened; when not discharged, it produces the phenomena of flatulence, enlargement of the abdomen, and borborygmus.

Children at the breast evacuate the bowels several times a day without the presence of disease; but any irritation may increase the normal secretion, and give rise to purging, which is not always a sign of disease, as in the excitation of the functions of the muciparous follicles during the period of teething. On the other hand, it should be regarded as a serious affection when occurring after the continuance of scarlatina, measles, or small-pox, or when, under any circumstances, it produces debility and emaciation.

Tenesmus is a sign of disease in the rectum or colon; hæmorrhoids, or worms, in the large intestines.

Constipation may arise from defect in the biliary or intestinal secretion, or from inflammation of the intestines or of the brain, or from mechanical obstructions in the bowels, as scybala, conglomerations of worms, and intussusceptions.

The alvine evacuations vary in a healthy state according to the food used. New-born children evacuate the dark substance known by the name of meconium. Sucking children pass a quantity of fæces, of the consistence of pap, and of a yellowish color. The prevailing color of the fæces in children, at all ages, is yellow.

The substances discharged may be food, serum, mucus, bile, pus, blood, false membranes, and worms. If digestible substances pass partly or not at all digested, it is a sign of inflammation in the intestinal tube, or of weak digestion. The discharges may be acid, frothy and highly offensive, as in cholera infantum, and are evidences of the deficiency of the biliary secretion. Thin fluid mucus is a sign of intestinal catarrh. It occurs in children affected with remittent fever. If it be viscid, the prognosis is worse than when it is thin. Excess of bile occurs during the heat of summer, and is an evidence of great irritation of the liver or duodenum. The evacuation of blood is a sign of hyperœmia, irritation, and inflammation, wounding or ulceration of the intestinal canal; it is less unfavorable in little children than in adults. The passing of worms is an important diagnostic and prognostic sign: for if the symptoms of disease abate after their discharge, it is an evidence that they were caused by the worms, and the prognosis is favorable.

The fulness of the abdomen is an important means of distinguishing diseases of the intestinal canal from those of the brain in children; and in them the fulness under the epigastrium, by the enlargement of the transverse colon, is very common, especially in those of a scrofulous habit. A very inconsiderable disturbance in

Symtoms [illegible]

the functions of the intestines produces it in them, because their pelvis is small, and the liver large.

If abdominal pain arise from peritoneal inflammation, slight pressure or mere contact produces a great aggravation; but if paroxysms of pain arise from flatulence, they abate on pressure. When there is severe pain on pressure of the abdomen, nothing will divert the attention of a young child. The best method of ascertaining the actual existence of pain, is to raise the child from its bed, expose it to a strong light, and press with force on the abdomen; and although the child may have cried violently before, its cries will cease, and its attentions be fixed steadfastly on the light, if there exist no abdominal pain. If this sudden exposure to light fail in calming the child, we may then be satisfied of its acute and continued suffering.

DISEASES OF THE DIGESTIVE ORGANS.

STOMATITIS—INFLAMMATION OF THE MOUTH.

The mucous membrane of the mouth is very liable to become inflamed in young children. It may be simply an erythematic form, without being followed by any result; or may terminate in exudation of concrete mucus, ulceration, or gangrene.

The first-mentioned termination of stomatitis is an altered secretion of the part, having the appearance, most commonly, and always at the commencement, of white spots, resembling a small white flower, known in France by the name of muguet. Ulceration may occur in any part of the buccal mucous membrane. When it appears on the mucous follicles, it is the second stage of aphthæ. Gangrene may be the termination of all the others, or may be a distinct variety, commencing usually with an œdema of the part, and sanguineous congestion of the cellular tissue.

Etiology.—This disease often arises from a state of congestion in the mucous membrane, at the earliest age, a condition peculiar to the young infant at birth. The youngest children may therefore be affected with the simple variety, and that which is attended with a concrete exudation or altered secretion, or muguet; a term which has also been recently adopted in the English language.

It may also be brought on by cold, any irritation in the mouth, as hot or stimulating food, too frequent use of the sucking bottle, but more especially from teething. Scarcely an infant passes through the period of teething, without suffering more or less from this affection. A deranged condition of the alimentary canal, accompanied by acidity, is almost always the cause of the aphthous and ulcerous variety of stomatitis; and, indeed, the disease, in all its forms, appears connected with an irritated or phlogosed state of the other portions of the primæ viæ.

The different forms of stomatitis have of late years attracted a great deal of attention in France, and a diversity of opinions prevails as to the nature and cause of these varieties. These will be considered below, under the head of pathology. It appears to prevail extensively, where many children are crowded together, and suffer from the necessary deterioration of the air; it has on this account been thought contagious. Children, however, who have not been affected with it, have not taken it even after drinking from the cup used by those who have labored under the disease.

When it extends to the cellular tissue of the cheek, and terminates in a total destruction of the tissue, forming the affection known by the names of gangrenous erosion of the cheek, or cancrum oris, it becomes a very serious and fatal affection. The connexion of the inflammation with an œdematous condition of the affected part, appears to cause a retention or stoppage of the blood in the capillary vessels, by which an indolent engorgement takes the place of inflammatory action. That this pressure is the cause of the gangrene, appears from the fact, that the most usual place of its appearance is where the parietes of the mouth are most exposed to pressure, opposite the horizontal part of the jaw and dental arch. There exists in infants a predisposition to serous infiltrations, which renders them liable to this termination of stomatitis. It would appear to be more common in foreign hospitals than in this country, and is there exceedingly fatal, as indeed are all the inflammatory and ulcerous disorders of the mouth. This œdematous condition of the cellular tissue of young infants is peculiar to continental Europe, and the infiltration proceeds to such an extent, as to produce an induration of the body. Where this gangrenous affection occurs in older children, there is also a manifest tumefaction, with other symptoms, either local or general, of dropsical effusions.

Semeiology.—In the simple or erythematic form of stomatisis, the mouth appears very red and hot; sucking, mastication or deglutition are difficult, and often very painful; and the pain arising from sucking, will often prevent the child from taking the breast. When it appears in teething children, an exceedingly profuse flow of saliva occurs. The inflammation spreading to the borders of the lips, forms ulcers, which, exciccating, produce a species of herpes. If the disease be very severe and protracted, small ulcers appear on different parts of the mucous lining of the mouth, on the frænum of the tongue, at its base, internal surface of the cheek, and on the palatine arch, which have a yellowish white appearance, and around their edges the inflammation is very intense. A considerable degree of fever and restlessness, together with a derangement of the digestive organs, attend the local inflammation; and when the disease is extensive, it is attended with more or less diarrhœa. The cry of the child indicates pain, without, however, any alteration in the tone.

When the disease produces an exudation on the surface of the diseased membrane, it is known by the names of millet, white thrush, muguet, and is the form of disease designated by nosological writers by the title of aphtha lactantium. In this form the inflammation is very extensive, descending throughout the whole intestinal canal, when the disease is severe. This secretion varies much in appearance in different parts of the mouth; sometimes appearing in small white spots on the tongue, and again occupying other parts of the buccal mucous membrane, in the form of irregular patches. Sometimes, also, it will be spread over the entire surface of the back part of the mouth, in the form of a membrane. This affection of the mucous membrane, pouring out an altered, concrete secretion, must not be confounded with aphthous ulcerations. It is only of late years that the distinction has been made, and the difference clearly ascertained. It may be known from apthæ by the curd-like appearance of the concretion, as if the affected part were dotted, or lined with cream or curd. When the disease increases, the concretion spreads, and unites in the form of a pellicle, constituting the confluent form. Vomiting and diarrhœa not unfrequently attend this disease, when it has continued for a length of time, and are evidences of the progress of the inflammation to the other portions of the digestive passages.

When the inflammation more especially affects the muciparous follicles of the mouth, which may occur in those in whom they are prematurely developed at an early period, or at the time of dentition, when they first assume their peculiar functions, which is indeed the period of the affection of the follicles, a peculiar form of the inflammation, and subsequent degeneration, arise. This is what is usually known as aphthæ. The disease shows itself under the form of small white points, with the appearance of a slightly prominent spot, of a darker color in the centre. They may appear distinct, and few in number, or spread over every part of the mouth; and usually show themselves first near the lips and angle of the mouth.

Sometimes the inflammation stops in the first stage, without proceeding to ulceration; but if it persevere, a white purulent looking fluid is seen to issue from the centre, diffusing itself over the surrounding parts.

When the ulceration proceeds, the aphthæ assume a new appearance; the borders are prominent, the ulcer slightly cupped, and this ulceration secretes a pultaceous matter, which adheres for a while, and then becomes detached in the form of a small scab. When the aphthæ are numerous, the ulcerations unite, run into each other, forming a confluent state of the disease.

At the commencement of the ulceration, a bloody oozing not unfrequently takes place, which drying, forms a brown scab. Such are the local symptoms of aphthæ; and when the affection is mild, the child will experience but little, if any, disturbance of the general system.

When, however, the eruption is extensive, there is often a great degree of drowsiness, sometimes with a slight fever, thirst, and pain. A great restlessness usually accompanies the disease, while the acid eructations, and loose green stools, attest the extensive nature of the affection. There is no moisture of the skin, which is generally harsh and dry. The primæ viæ, however, are more often affected than any other part, as the frequent vomiting, and thin, offensive alvine evacuations show. These discharges are often so acrid as to excoriate the anus and nates. As the disease advances, the looseness of the bowels increases, and the child becomes much emaciated, and suffers greatly from severe languor and sinking. When aphthæ becomes gangrenous, the surface is of a brownish hue, covered either with a hard or pultaceous eschar, while the parts surrounding them are of a dark modena hue, and much swollen. The edges of the ulcer appear as if burned, and emit a very offensive odor. The sufferings of the child prevent him from closing the mouth, and the saliva, mixed with fragments of the eschars, freely flows out; the face becomes pale, and the pulse extremely feeble; the child at last sinks in a complete state of exhaustion, from the combined effects of the profuse discharges from the bowels, and the state of inanition into which it falls, from the impossibility of swallowing food.

From this account of the symptoms attending stomatitis, the various forms of the affection may be readily distinguished. The only difficulty on this point may arise between a severe exudatory stomatitis and the aphthous affection; the latter, however, may be known from the manner of its commencing, always appearing in spots, by its uniformly preserving its circular form, and by being always surrounded by a red circle. The aphthæ, before they become inflamed, may generally be seen, and always felt, as M. Billard asserts.

Morbid Anatomy.—The anatomical nature of the simple form of stomatitis is evident from the symptoms detailed above. It consists of a sanguineous congestion of the mucous membrane, and is often attended with a similar condition of the stomach and intestinal canal.

The ulcers that form from the erythematic inflammation of the mucous membrane, appear to be a softening of the mucous membrane. A sort of pulpy degeneration of its texture, according to M. Denis, takes place in the palate about the median line. If this pulp be raised, the bottom of the ulcer is found to be the healthy bone.

The exudation following the inflammation of the mouth has received, within a few years, a great deal of attention on the part of the French pathologists; and it is only of late years that its true pathology has been ascertained, and the line of distinction drawn between this form of disease and the aphthous affection of the mouth. The works of Breschet, Guersent, Lélut, and Billard, contain a clear account of the nature of this pseudo-membranous formation. Guersent* considers muguet as a local affection, capable of affecting almost any part of the intestinal tube. M. Denis† also considers it in the same light. Valleix‡ entertains the same view of it, and that its seat is throughout the entire digestive passages, the affection of the mouth being merely a part of the general disease. M. Billard regards it as stomatitis, with altered secretion. There is reason for believing, that, like all other affections of the mucous covering of the mouth, the disease may be transmitted by continuity of membrane; and this is precisely what takes place: for it not unfrequently appears around the gums, edges of the tongue, etc., extending ultimately to the pharynx and œsophagus.

A sanguineous congestion always attends the disease in question; points or shreds of a white concrete mucus are spread over every part of the interior of the mouth, and always on the surface of the epithelium. The varieties of form have reference to the seat; that which appears in points is at the extremity of the tongue. The cheeks are covered with laminæ; and that which assumes the membranous appearance occurs at the velum and base of the tongue: the villosities of the mucous membrane being longer and less fine at these parts, the mucus is secreted in the form of a membrane. M. Lélut, after a number of experiments on the nature of the membrane, arrives at the opinion that it bears a great resemblance to the buff of the blood and false membrane of the croup; hence it would appear that the inflammation had rendered the mucous secretion more rich in fibrin.

When the inflammation has extended to the pharynx, tonsils, and parts adjacent, an exudation of a very dangerous nature occurs, known by the name of diphtheritis; its danger arises from the narrowness of these passages in children. This exudation is of the nature of lymph, and may be at times removed from the part over which it is spread, without leaving any destruction of parts beneath, even though the pellicle itself be in a state of decomposition. In many instances, however, where the disease is rapid, the parts beneath have been found in a state of gangrene and disorganization.

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* Dict. de Méd., in 21 volumes, Art. Muguet.

† Recherches d'Anat. et de Physiolog. Path. sur plusieurs Mal. des Enf., 1836, p. 106.

‡ Clinique des Mal. des Enf.; Paris, 1838, p. 203.

The precise nature of aphthæ has been the subject of much investigation; and from the time of Bœrhaave to that of Bichat, much genius has been displayed in the endeavor to ascertain their precise seat and nature. Callisen has described them as small tumors, arising from the affection of the mucous glands. Gardien regards them as vesicles; and Billard considers them as a morbid development of the muciparous follicles of the mouth, sometimes in a state of simple tumefaction, at other times in a state of ulceration.

In fatal cases of aphthæ, the inflammation not unfrequently prevails through the whole intestinal canal, while the aphthous affection in some cases extends only through the œsophagus. Small superficial ulcerations have been found in various parts of the intestinal passages. Excoriations exist about the anus, caused by the acrid nature of the discharges.

The pathology of the ordinary affections of the mouth which terminate in gangrene, is detailed in the symptoms of these affections; for the actual anatomical disorganization is through life the subject of every day's inspections, and therefore needs not to be repeated here. A few words, however, are necessary, with respect to the nature of the gangrenous erosion of the cheek, and the pathological condition connected with it.

The subjects of this disease are generally in an enfeebled condition, often from the effects of previous disease, as intermittent or remittent fever, and, as is not unfrequently the case, as a sequela of these diseases, the patients are in a dropsical condition. The local affection scarcely appears to be of an inflammatory nature, while a swelling and apparent congestion exist in the forming stage, and the part actually appears paler than natural, and no increase of heat is perceptible. An œdema of the part is doubtless one of the causes of the rapid disorganization and sloughing.

In children advanced beyond the period of teething, gangrenous affections of the mouth appear to depend on diseases of the teeth, their fangs, or the periosteum, covering their roots or sockets. Where great debility of the system prevails, and the still growing teeth press on the periosteum, a membrane possessing but little vitality, it is unable to bear the additional extension it undergoes across the unyielding bone. The blood consequently ceases to circulate in it, and it dies. Ulceration of the adjacent parts follows: and the periosteum having scarcely any sensibility, the sympathies of the other parts of the system are but little interested, until an extensive portion of the mucous membrane of the mouth or mass of cellular substance becomes affected. This explains the rapid and extensive penetration of the ulcer along the roots of the teeth, and the destruction of the bone.*

TREATMENT.—The treatment of stomatitis, in its various forms, may be divided into local and general.

Local Treatment.—The milder form of this disease, in its different varieties, will often require no other treatment than such remedies as may be applied directly to the seat of the affection. In the simple erythematic inflammation, mild mucilaginous applications are the most rational and the most efficacious; and nothing can be more injurious than the use of irritating and stimulating agents, which not unfrequently are resorted to at the very commencement of the disease. Various mucilages have been used, such as a mixture of cream and the white of an egg. A piece of the bark of slippery elm (ulmus fulva), saturated with simple syrup, may be given to the child to chew, or it may be held in the mouth by the nurse; or a decoction of flaxseed, or powdered gum-arabic, may be used for the same purpose.† The latter substance, in fine powder, introduced in small quantities into the mouth, I have found to be the remedy the easiest of application, and the most efficacious for the disease, the adhesive nature of the gum causing it to be retained in the mouth much longer than any other substance. It may sometimes happen that the violence of the inflammation may require leeches to be applied; when these are necessary, the angle of the jaw, or about the part near the inferior portion of the ear, will be the best place for their application. When an enlargement of the submaxillary glands accompanies these affections of the mouth, they should be applied in the vicinity of these glands. Some caution, however, should be used in applying leeches in those cases where there is much constitutional debility, or where the affection has arisen after other protracted diseases.

Should ulcers appear, or the exudation of altered mucus show itself, some stimulating applications will be necessary to alter the action of the capillaries of the affected part. In the former case these applications may be made directly on the appearance of the ulcer; in the latter, not until the inflammation has been in some measure allayed. Borax has for a long time been a highly popular remedy, combined, in a fine powder, with an equal quantity of white sugar, which may be put into the mouth dry; or a wash made of a drachm of honey of borax and an ounce of water, applied by means of a soft piece of rag, or a camel's hair pencil. Alum has also been used for the same purpose, and is certainly a very useful remedy, and has appeared more successful than the more popular one just mentioned.* The cutting of the gums should never be neglected, if there are indications of the protrusion of the teeth; and scarifying the gums is necessary in that form which accompanies the process of dentition, known by the tumefaction and sponginess of the gums and decaying of the teeth. The mouth, in this affection, should also be freely washed with a decoction of cinchona or oak bark. These astringent washes, also, are often all that is required to treat the slight ulcerations of the mouth; a small piece of alum should be dissolved in the infusion, to increase the efficiency of these means; and, in severe cases, chloride of soda, in the proportion of half a drachm to three ounces of water, will be found useful.

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* V. Dr. Coates, in N. A. Med. and Phys. Journal, 1826.

† ℞ Mist. Acaciæ,
Albuminis ovi.,
Syrupi, aa. partes æquales. M.
Linctus for local inflammation about the mouth.

In the ulcerated mouth, and in aphthæ, properly so called—the second stage of the morbid development of the follicular apparatus of the mouth—much the same treatment will be necessary; and in obstinate cases, a change in the remedies applied will often be found necessary. Dr. Dewees speaks of the benefit derived from Armenian bole, mixed with powdered loaf sugar, and sprinkled in the mouth. Sulphate of copper, however, is the most powerful and useful stimulant and should be applied in the proportion of ten grains to an ounce of water, with a fine camel's hair pencil. According to the strength of the solution, it is either a powerful stimulant or an escharotic, and therefore is applicable to every form and variety of ulceration. Nitrate of silver is also a very efficacious means of arresting the extension of the ulcers; and in the case of confluent ulcerations, may be applied in solution over every part of the diseased surface. In distinct aphthæ the solid form is the best, being used to touch the ulcers, which will quickly yield to this remedy. Chloride of soda has been recommended by M. Guersent; it is more particularly applicable when sloughing has ensued, and the decomposition of parts has commenced, which may be known by the fœtid odor of the breath. In these instances of sloughing, the most powerful escharotics will be found necessary for the arresting of the disease, by the destruction of the part; and the muriate of antimony is that which has been found the most efficacious. Muriatic acid has also been used in severe cases, even in an undiluted state; but it is not so safe as other escharotics, from the difficulty of controlling its ac-

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*℞ Mellis Rosæ, ℥ij.
Aluminis, ʒj.
Tinct. Myrrhæ, ʒss. M.
To be applied to the ulcers of the mouth.

℞ Aluminis, ℈j.—℈ij.
Aquæ Rosæ, ℥ij.
Solve. M.

tion. In the use of all these stimulating and escharotic applications, their effects should be carefully watched, that an increase of inflammation may not be caused by a too persevering use of them. They may from time to time be suspended, and mucilages substituted, when much irritation or inflammation is present. They may be applied with more safety by means of a small glass capillary tube, immersing one end in the acid, and drawing up one or two drops, and then depositing them on the surface of the affected part. On the separation of the eschar thus formed, it would not be proper to repeat the same application, as the part would be left in a state of extreme irritability. A pencil of nitrate of silver will be found the best escharotic for subsequent use, as it can be repeatedly used without causing an increase of the inflammation.

General Treatment.—In every form of stomatitis, a greater or less derangement of the primæ viæ exists; it will, therefore, be necessary to pay some attention to the condition of the stomach and bowels. It ought, in the first place, to be the care of the physician to ascertain whether there exists any inflammatory action in the mucous membrane of these parts, before the administration of active purgatives or emetics. Often, however, the existence of a high state of irritability, or slight inflammation, has its cause in the presence of acrid or acid indigestible matters, which ought to be removed by appropriate means; and it not unfrequently happens that the disease has been entirely arrested by the administration of some mild purgative. Castor oil or magnesia, according to the prevailing indication, is the medicine most applicable to the condition of the stomach and bowels, when it is deemed necessary to administer aperients; the occasional use, also, of mild purgative remedies, when not contra-indicated, will also be necessary throughout the disease, to preserve the secretory apparatus of the intestines in a state of functional activity.[*] A full dose of calomel, when the bowels are obstinately constipated and tumefied, may be required. When the breath is offensive, with nausea, a mild emetic, such as ipecacuanha, will often remove the irritating cause of the affection.

In case of tenderness of the abdomen, indicating inflammatory action in the bowels, or when the stools are streaked with blood, warm baths and fomentations to the abdomen will be necessary, while active purgatives should be avoided; mucilages ought, under these circumstances, to be freely used. The warm bath will also be serviceable when there exists much general heat of the body;

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[*] ℞ Pulv. Rhei., ℈j.
Magnesiæ, ℈ij.
Pulv. Acaciæ, gr. x. M.
Dose from three to four grains every third hour, to a child of six months old. Six to ten grains, for one a year old.

℞ Infus. Rhei., ℥ss.
Sulph. Potassæ, ʒij.
Tinct. Cinnamon, ℥ss.
Syrupi Sennæ, ʒiv. M.
One to two drachms every three hours.

and if accompanied by restlessness, anodynes,* judiciously administered, are of singular efficacy in calming the nervous commotion of young children, and greatly add to the diaphoretic effect of other remedies, and materially aid in the restoration of the lost balance of circulation. One of the best forms in which an anodyne can be given, is Dover's powder. Should there exist much acidity, and especially if accompanied with diarrhœa, and absence of abdominal pain on pressure, prepared chalk, combined with the pulv. ipecac. c., before mentioned, should be given every two or three hours, to arrest the alvine discharges.

Dr. Eberle† says, that in obstinate cases of aphthæ, he has found great benefit to arise from the use of a solution of nitrate of silver, internally administered, in the proportion of a grain to two ounces of water, a teaspoonful to be administered to infants between two and six months old, every four hours. Powdered borax has also been given in similar cases with advantage. It is extensively employed in Germany in the treatment of infantile diseases, in cases of acidity and aphthæ. It is given in the form of a linctus, made with the honey of roses; half a drachm to one drachm of the former to two ounces of the latter; a teaspoonful four times a day. Richter advises it, combined with magnesia.

Mercury has been used, it is said, with good effect in these affections; and it has been recommended on the ground that the constitutional change resulting from its use will not be counteracted by the affections of the salivary glands or gums. It must, however, be a hazardous remedy, and one which we should not be disposed to try in any form of stomatitis, especially after the period when the salivary glands have begun to act.

On the appearance of sloughing, great prostration of strength ensues, and it will be necessary to resort to stimulants to sustain the strength, as wine whey, or ammonia. Tonics, also, become necessary, and at the head of this class of remedies stands quinine.‡ The tartrate of quinine, especially, has been recommended in cases of gangrene. Chlorine, in the form of chloride of soda, has also been used as a stimulant, in sinking cases of aphthæ and gangrenous affections of the mouth. Dr. Evanson mentions that the use of iodine has been attended with success; the manner of its exhibition and dose he does not mention. The subjoined formula, however, may be used.[*]

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* ℞ Aquæ Destil, ℥j.
Mist. Acaciæ, ℥ss.
Syrupi. Simp., ℥ss.
Tinct. Opii. Guttam. M.
Dose, a teaspoonful repeated every half hour, till rest be procured. Double that quantity after a month.

℞ Aq. Fœniculi., ℥j.
Tinct. Opii, gt. vi.—viij.
Syrup. Aurantii, ʒvj. M.
A teaspoonful every hour, to a child of two years.

† Op. Cit., p. 179.

‡ ℞ Quinæ Sulph., gr. ij.
Acid. Sulph. Aromatic, gtts. xvi.
Syrup. Caryophill., ℥ss.
Aquæ Destill., ℥iss. M.
S. Dose, 1 to 2 drachms thrice a day.

Where it is necessary to remove the irritating and putrid matters swallowed, and to keep the bowels free in the sloughing stage of these affections, spiced or aromatic syrup of rhubarb will be found peculiarly appropriate, carefully watching against a hypercatharsis. In the state of debility and manifest loss of vital powers, after the gangrene has commenced, it may sometimes be necessary to have recourse to stimulants, to rally the receding powers, and to restore energy to the action of the heart.[†]

The child should be kept exclusively to the breast, if it be not weaned. The mildest and least irritating food must be the only kind allowed to those artificially fed, or who have passed the period of nursing. Arrow-root, soft boiled rice, sago, or tapioca, are the most proper vegetable aliments; and soft boiled eggs, calves' feet jelly, chicken broth, may be required, when a state of debility and sinking demand articles more abounding in nutrient qualities.

GANGRENE OF THE MOUTH.

That form of ulceration which is known by the name of gangrenous ulceration, or gangrenous erosion of the cheek, and which consists of a tumefaction of the affected part, and its subsequent alteration, softening and destruction, demands an especial notice; for it can hardly be classed with any of the preceding forms of stomatitis, inasmuch as it appears to depend for its peculiarity more on an œdema of the part, and the congestion of the capillaries, than an active inflammation. MM. Baron and Guersent have written largely on this subject. The former, especially, has examined closely into its nature, and caused the treatment in the different stages of the disease to be more strictly founded on pathological principles.

Etiology.—This affection is peculiar to children between the ages of two and five years; and makes its appearance in such as are of a debilitated habit, arising from imperfect diet; while impure air and a low, damp situation increase the predisposition. Sometimes it follows long-continued fever, evidently depending on the debility thereby induced. It has often been a severe scourge in alms-houses and asylums for children. A few years ago it prevailed in the New York alms-house to a great extent, the impurity of the air from the crowded condition of the house being evidently the chief predisposing cause.

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[*] ℞ Iodinii, gr. v.
Potass. Hydriod., ℈ss.
Aq. Destil. ℥ij. M.

To children under seven years 2 drops twice a day, gradually increased to 5 drops; to children above seven, the dose may be progressively advanced to 16 drops, in a little water.

[†] ℞ Aquæ Menthæ, ℥iss.
Sp. Ammon. Arom., ʒss.
Sp. Ætheris Nitrici., gt. xij.
Sp. Lavand. C., ʒj.
Syrup Caryoph., ℥ss. M.

Dose, a teaspoonful every two hours.

℞ Ammoniæ Sesquicarb., ʒss.
Aq. Menth. Pip., ℥vij.
Syrup. Aurant., ℥ss. M.

A tablespooful occasionally.

Semieology.—The first appearance of this disease is a tumefaction in the cheek without inflammatory action. There is no pain, nor any tenderness on touching it: indeed so little of disease appears in the part, and as there is no complaint, it for sometime escapes notice, and it is only the enlargement that attracts attention. The skin over the tumor is shining and white, of a remarkably peculiar aspect. The interior of the mouth exhibits in the part corresponding with the external tumor an ash-colored eschar, also destitute of the usual marks of inflammation. The general system is affected in no other way than by an unusual lassitude and debility, with a trifling fever.

In the second stage of the disease, the slough spreads over the cheek and lip, and the saliva escapes in large quantities, becoming as the disease increases of an offensive sanious nature. The outside of the cheek at this period also exhibits the commencement of disorganization, at first in the form of a pale ash-colored spot, which quickly becomes livid. The discharge is of an acrid an irritating nature, excoriating the parts over which it passes, and it even appears to possess the quality of inducing a similar disorganization, for other parts of the lips and lower portions of the face put on the appearance of commencing mortification. The disease even extends to the alveolar process and osseous parts of the jaws, producing a loosening of the teeth, and at times an excessive destruction of the maxillary and nasal bones.

The pulse is in most cases feeble, small and frequent even from the commencement of the disease. The bowels are constipated at the commencement of the disease, but become excessively relaxed toward the close.

Treatment.—In the forming stage, that of infiltration, the application of stimulating frictions to excite the absorbent vessels will be found necessary. Liniment of hartshorn may be used for this purpose, or a solution of muriate of ammonia, applied to the cheek by means of pledgets saturated with the solution. Upon the appearance of the least ulceration, or should a violet spot show itself on the cheek, more active measures will be necessary; and muriate of soda, muriatic acid and honey, caustic potash, and muriate of antimony, have been employed by various practitioners with success, according to the representations of the French physicians. The actual cautery, also, in the hands of MM. Jadelot, Guersent and

Baron, it is said, has been of eminent service in the gangrenous stage of this affection; but we may judge of the success of these means, and especially of the latter, by the candid acknowledgment of M. Marjolin:* "Almost all children," says he, "affected with this disease in the Parisian hospitals, die." He also uses the bistoury and scissors to remove the thick sloughs. Dr. Burns used chloride of lime, nitrate of silver, carrot or yest poultice. Nitric acid, also, has been employed with advantage in severe cases of gangrene.

Sulphate of copper, however, is the remedy which has succeeded beyond all others in changing the character of the ulcers, and causing a rapid healing of the part. It has the advantage over actual cautery, from the facility with which it may be applied to every portion of the disease; and every part ought to be brought under the influence of the application. The solution should be made strong, in the proportion of two drachms to a four ounce mixture.†

The general constitution should receive particular attention, and every means used to impart tone and vigor to the system. Sulphate of quinine and similar tonics, especially iron, will be the most appropriate remedies for fulfilling this indication where there is no febrile excitement; and the diluted sulphuric acid where fever is present. Alcoholic stimulants also will often be found necessary when there is much debility, and the means suggested for the treatment of stomatitis will be found the most suitable for the disease now under consideration.

TONGUE-TIE.

The frænum of the tongue sometimes extends quite to the extremity, or is so short as to interfere with the proper movements of that member. When this is found to be the case, and the child sucks with difficulty, the division of the membrane must be made; an operation of great simplicity, although not free from danger, as serious hermorrhages have occurred from a wounding of the blood-vessels beneath the tongue, and from the tongue passing back on being loosened, so as to close the glottis. The best method of performing this operation, is to place the fore and middle fingers of the left hand beneath the tongue, on each side of the frænum, and with a single stroke, with a sharp gum lancet or probe pointed scissors, in a downward direction, divide the frænum. It is very common for nurses and mothers to request the attention of the physician to this subject when no interference is necessary, which may be known by the child being able to suck.

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* Art. Gang. de la Bouche, Dict. de Méd.

† Vide Dr. Coates, in N. A. Med. and Surg. Jour., 1826.

MORBID DENTITION.

Some philosophical writers on medicine do not allow dentition to enter into the number of diseases; but it is evident to all practical men, that irritation, inflammation, fever, and other affections, both local and general, not unfrequently attend this process. Although the operations of nature are conducted in so complete a manner as to make it unnecessary and unwise to interfere in the natural development of parts, yet the inflammation, fever, and other morbid phenomena, dependant on the eruption of the teeth, fraught as they are with great evil in the tender and susceptible system of infants, demand for them a distinct notice. Dentition is not itself a disease; yet the injudicious feeding of infants, impure air, and other circumstances attending an artificial mode of life, will render the process one of difficulty and danger.*

ETIOLOGY.—The morbid phenomena attending teething have their origin in the pressure of the growing teeth on the periosteum and gums; depending in a great degree on the peculiar temperament of the infant. Some are affected with inflammatory, and others simply with a nervous excitement. This pressure is not in the same degree through the whole course of teething. At first, before the teeth have pressed much on the gums, and while they are passing from the pulpy to the bony consistency, the pressure is principally by the root shooting inward; this occurs about the third or fourth month of infancy. At a little later period, about the sixth month, the pressure is exerted on the gum, and the peculiar symptoms of dentition present themselves. The pressure is also made by the rising tooth on the membranous expansion over the tooth. From these irritations, distant organs are also sympathetically affected. On this account, the period of teething is the most critical of childhood, and the diseases with which children are attacked at this time, are rendered more dangerous from the constitutional irritation produced by teething. This extensive sympathy arises from the extremely irritable state of the system in infancy; for at a later period, when larger teeth are cut, but comparatively little constitutional disturbance ensues.

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* The following fact, related by M. Roberts, in his Traité des Principaux Objets de Médicine, is an instructive illustration of the effects of morbid dentition. A child, after having suffered greatly from teething, died, as it was supposed, and was duly laid out in its burial clothes. M. Lemonnier, having some business at the house of the nurse where the child had been during its last sickness, learned the facts above stated, and being curious to ascertain the condition of the alveoli in an instance where the teeth had not protruded, requested and obtained permission to make an autopsical examination. He commenced by an extensive and deep incision into the gum; and while he was preparing to extend his investigations, he observed the child open its eyes, and give other signs of life. He immediately applied such remedies as the nature of the case required; stripped off its shroud, applied other and warmer covering, and with care and good nursing the teeth soon appeared, and the child ultimately recovered its health.

One of the causes of painful and morbid dentition, is the unequal and disproportionate development of the teeth and jaw; their sudden and simultaneous appearance also becomes a source of disease, from the united pressure of many teeth, and the great afflux of blood it occasions.

The conditions of the system predisposing to constitutional disturbance from teething, are those which are connected with an irritable state of the nervous system, from whatever cause it may arise. The younger, therefore, the child is, the more will it be likely to be affected with serious disturbance during the process of teething; and all feeble and delicate children are more affected in this process than those who possess more stamina. Such infants often suffer from protracted diarrhœa, and die, wasted with marasmus. This class of patients is found among those who suffer from bad food, who labor under the effects of indigestion, and who are exposed to the debilitating influences of impure air.

In children of an opposite condition, also, the consequences of difficult teething often show themselves with great severity; in those, whose condition is that of plethora, the effects of teething are often sudden and violent, and accompanied by much febrile disturbance and inflammatory action. In them, also, the cerebral disturbance is often very great, from the supply of blood required in the state of active development of the brain. There can be no question that the greater number of diseases, at the time of teething, have their origin in plethora, induced by over feeding, or any other cause which will produce an irritated state of some of the organs; thus predisposing the child to be influenced by the excitement of teething. Accumulation of heat, therefore, about the head, by having it too warmly covered, may excite a flow of blood to the cerebral organs. So, also, warm clothing generally will produce a febrile action, which, when the system is under the additional excitement of dentition, will be developed into some inflammatory or congestive disease.

Semeiology.—There is always a considerable swelling, heat, redness and pain in the gums. Their tenderness is at first extreme, allowing scarcely any pressure. Afterward, as the tooth advances toward the surface, a change occurs in the appearance and sensibility of the gum; it is no longer so fiery red, and pressure rather gives ease than pain. The salivary glands enlarge, and an abundance of saliva flows from the mouth. With this afflux of blood to the mouth, stomatitis, in some of its various forms, arises. The blood being determined to the head, a turgescence of the face and eyes will appear. Thirst, heat, restlessness, and the usual symptoms of fever, also show themselves: the sleep is disturbed, short, and unrefreshing, arising from the disturbance of the brain and nervous system. This irritation of the nervous system may increase, until some convulsive movement is observed, together with a rolling of the eyes during sleep.

Other spasmodic movements may arise, and when affecting the glottis, produce a difficult and distressing respiration. This affection has been known by the names of spasmodic or chronic croup. M. Guersent has described it by the name of *Pseudo-croup nerveux;* M. Gardien, by that of *Spasme du thorax et de la glotte.* It has also received the attention of Cheyne, Munroe, Hamilton, and others. This disease is more particularly described under the article of spasmodic croup, to which the reader is referred.

The late Dr. Parrish has described a peculiar spasmodic affection of the intestines, arising, as he supposes, from the irritation caused by teething. The abdomen swells, while a spasmodic contraction of the muscles of the face and limbs takes place, and the ordinary action of the bowels is arrested from the same cause. On the escape of air from the bowels, a complete relief to the symptoms occurs.

During the period of teething, there is always a greater or less disturbance of the digestive organs, manifested by a morbid irritability of the stomach, and an acid odor of the breath and matters vomited. The diarrhœa, so common in teething children, is, when moderate, always to be regarded as a salutary evacuation, as it relieves the tendency in plethoric children to local congestions. This diarrhœa, however, should only be regarded as the effect of the simultaneous development of the muciparous follicles of the intestines, which occur with other parts of the system concerned in digestion: that is, the teeth and salivary glands. The tongue, with this diarrhœa, continues natural, the appetite is unimpaired, and the child continues to thrive. Both the diarrhœa and vomiting which sometimes occur, may continue until they become very serious and fatal affections.

The vomiting and purging, so common in teething children, not unfrequently pass into a very serious disease. It has received particular notice from MM. Cruveilhier and Guersent; the former of whom describes it under the name of *Maladie gastro-intestinale des enfants avec desorganisation gelatiniforme.* The name sufficiently indicates the nature of the disease, when it has passed from a simple disturbance of function, to a disorganization of tissue; dissection showing that the mucous membrane of the stomach and intestines has been reduced to a pulp, but without any appearance of inflammation.

Among the diseases to which children at this period are affected, one mentioned by Underwood as an occasional accompaniment of painful dentition, is a peculiar swelling of the hands and feet. He regarded it, like diarrhœa, as decidedly beneficial, or of but little importance.* It has, however, been described more at large by Dr. Kellie; and although in some instances slight, yet at other times it has constituted a very serious affection. It arises suddenly, is of a purplish mottled appearance, without heat, or any sign of inflammation. The swelling first appears on the dorsum of the hand or foot, and is firm, and does not pit on pressure. It sometimes continues for a month, and usually disappears suddenly. At other times it assumes a leucophlegmatic appearance, and extends to the whole limb. This condition is generally connected with a spasmodic contraction of the fingers and toes. The thumb is strongly bent inward, and pressed into the palm of the hand, as the toes are bent in a similar manner on the sole of the foot. The carpus is at times drawn in such a manner as to increase the sphericity of the metacarpal bones. There appears to be but little pain in the affected part.†

Diseases of the skin often occur during dentition, and from their disappearance on the protrusion of the teeth, are evidently caused by the irritation in the system at this period of life; and like diarrhœa, appear to be salutary, and therefore, when connected with teething, ought not to be removed. Among these cutaneous affections are strophulus *confertus*, strophulus *candidus*, and the species of porrigo on the forehead and cheeks, known by the names of crusta *lactea*, together with the erythematic efflorescence and ulceration behind the ears.

Dysuria, also, is an affection with which teething children are sometimes attacked. It occurs mostly in those that are debilitated, and whose digestion is feeble; and acidity of the stomach is its invariable attendant.

As all these disorders are considered in other parts of this work, it is unnecessary to treat of them here in detail.

MORBID ANATOMY.—In those children who have died from the effects of teething, manifested especially by great tumefaction of the gums, the post-mortem examination reveals a violet colored swelling, with fluctuation. On opening the tumor, dark colored fluid blood is found in the alveoli. The teeth are generally discovered loose and floating in the midst of the effused blood, which formed the tumor, and fall out with the blood that flows. These effusions in the alveoli become less frequent in proportion as the child advances in age, and as the tooth by its size fills the aveolar cavity. Other pathological appearances occur in other organs, according to the nature and seat of the complication.

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* Treatise on the Diseases of Children, by Michael Underwood, M. D., p. 140.

† Notes on the Swelling of the Tops of the Hands, etc., by Geo. Kellie, M. D., Ed. Med. and Surg. Jour., vol. xii., p. 449.

TREATMENT.—There were formerly a number of strange and superstitious practices recommended for the treatment of difficult teething; and the universal idea prevalent at every age, that something must be done, is an evidence of the distress that accompanies teething. The most barbarous, as well as the most refined, have thought it necessary to resort to some method of assisting the efforts of nature. The aborigines of our country gave smooth stones to their infants, with which to press their gums. The ancients, among those remedies that were rational, not unfrequently had recourse to such as had their origin in superstition or ignorance. Amulets and charms were formerly in common use; and such remedies as the brains of a sucking pig, milk of a bitch, and the blood of a cock's comb, rubbed over the gums, were freely used, by being applied to the part with the finger. The latter, especially, "is truly praiseworthy; for this," says Harttman, "being only once or twice, at most, anointed on the gums with the finger, causes a production of the teeth without difficulty, and free from accident."* However absurd these may appear, they still are evidences of the universal prevalence of morbid phenomena in teething children, and that the distress experienced by them requires the interference of art for its relief.

The local treatment of teething, when there exist heat, swelling and redness of the mouth and gums, or, in other words, when simple stomatitis is present, should consist of soothing emollients and mucilages. Cold water is exceedingly grateful to the hot and irritated mouth, and therefore the mouth should be frequently washed with it, and the child allowed freely to drink it; indeed, water ought frequently be given to a young child, especially in summer. A violent fit of crying will often be arrested by a draught of cold water. The instinct of the child for biting on hard substances, may be indulged with safety and advantage; therefore, a smooth piece of coral, ivory, or gum elastic, may be given to the child for this purpose.

The practice of furnishing children with a piece of coral is of great antiquity, and appears to have been connected with some superstition among the Romans, as we learn from the writings of Pliny; it was a charm against witchcraft, and was a common amulet of the Roman children. The use of this doubtless had its origin in the benefit children derived from it, and the superstition connected with it, from the mystical attributes which were supposed to belong to the substance.† The use of hard substances has been objected to by some physicians, but without much reason; for it is evident that the absorption of the gum is greatly promoted by the use of these substances, and the child is obviously much relieved by the use of them. Dr. Good supposes ptyalism is promoted by the use of a ring of gold, as the experiments of Dr. Chrestien show that powdered gold, applied to the gums by friction, produced ptyalism; but it is probable that no particular advantage can arise from a gold ring over one of ivory or bone. A piece of liquorice root, or slippery elm bark, or a crust of bread, will also be found highly useful in promoting the flow of the salivary fluid.

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* Henlock's Practical Treatise on Teething, 1742.

† Vide C. Plinii Secundi, Hist. Mundi, Lib. xxxii., Cap. ii.

When the gum becomes expanded over the tooth, and there exists much local inflammation or general disturbance, it should be freely divided, until the tooth is felt. Such a free division of the gum will often prevent the occurrence of serious consequences, which sometimes attend on teething, and which a slight exposure to cold or error in diet may induce. The effect on the general system of a young infant, by the pressure of a growing tooth, may be understood better when it is considered that the membrane which covers the crown is put on the stretch, whereby the nerves at the root are crowded, and great pain and irritation caused by the pressure. In every disease, whatever be its nature, the gums should be examined during dentition, and if there are evidences of the advance of any of the teeth, the gum should be promptly divided; for if the disease be not caused by the teeth, for the reasons just mentioned, the most serious irritations will be produced by the confined tooth, and thus add to the existing disturbance of the system.

The relief afforded to some children by the operation must be great, for they have sometimes, by pointing to the gum with the finger, signified a wish to have the operation repeated.

Objections have been made to cutting the gum, and its propriety questioned; but experience most abundantly proves the usefulness of the practice. It has been asserted, that the cicatrix which forms over the tooth, should the latter not appear immediately, will impede its advancement. This, however, is not true; for it is now well ascertained, that newly-cicatrized parts are the first to be removed by the absorbents, upon their excitement from any cause Newly-healed wounds, on the derangement of the system by which these vessels are brought into morbid action, soonest yield to their influence. The cicatrix would, therefore, rather favor the passage of the tooth, by its giving way easier to the process of absorption. It has been also said that the instrument might injure the teeth; but this can not occur, for the enamel is fully formed, and will sufficiently protect the teeth against any injury. The pain of the operation, also, has been urged as an objection to its use. The pain, if any, is instantaneous, and not to be compared with the constant suffering of the child during the pressure of the teeth, and the relief always experienced on removing this pressure. It should be performed by laying the child horizontally on the nurse's lap, who must, also, firmly secure the hands of the child; the gum-lancet is then introduced by the operator, who, with one hand secures the immobility of the jaw, and an incision is made deeply through the tumefied gum to the tooth. It may sometimes be necessary to repeat the operation, in consequence of the return of pain, irritation and tumefaction; for the tooth does not always appear, although the capsule in which it is enclosed be freely divided.

As to the general treatment, it of course depends on the complications, which have nothing in them peculiar, except so far as they depend on the local irritation, or are aggravated by it. These diseases will be considered in their proper places, and our remarks be limited to the general management of children during the period of teething.

As even the mildest cases are attended with great susceptibility of the system, every measure to keep the child calm and cool should be adopted. The head ought to be lightly covered, to prevent an undue accumulation of blood; and it has even been advised, by experienced practitioners, to wash the head every day with cold water. But the propriety of a measure like this may well be doubted, where the child has not been previously accustomed to such ablutions. It will be sufficient to use such measures as will naturally suggest themselves to every one, to prevent an increased determination to the brain, such as the avoiding the use of soft, warm pillows, the exposure of the head to the heat of a fire, or the rays of the sun.

The tendency to indigestion in teething children will require the greatest care with respect to their food. If the child is at the breast, it should by no means be weaned, if there is a sufficient supply of food, until nature herself has pointed out, by the appearance of the first teeth, at least, that the child is in a condition to receive a different species of nourishment; when an alteration may be made by commencing with some weak animal broth. When the child is artificially nourished, the lightest and least irritating food should be used; milk and water, tapioca, sago, arrowroot, or a mixture of rice water and milk. If the child appear to have a craving appetite, so as to require frequent feeding, by which a plethoric habit might be induced, it will be necessary to lessen the quantity of the nutritious portion, by diluting the food with water. One of the least irritating articles of food for a young infant, is the crumb of stale bread, well-boiled with water, and strained when it is first used, and mixed with a third of cow's milk; the consistence may be gradually increased or diminished, according to the necessity of the case. An error in diet, either in quantity or quality, may cause a great derangement in the primæ viæ, and diarrhœa, accompanied with colic and other distressing symptoms, ensue. A moderate diarrhœa is both natural and salutary, and requires no interference. If, however, the discharges become green, attended with pain or much prostration, it will then be necessary to interfere for the relief of these untoward symptoms. The subject will be more fully considered when we are treating of diarrhœa, keeping in mind that a sudden stopping of the discharges from the bowels of teething infants, is always attended with danger of producing convulsions. The subjoined prescription will be found useful in controlling these evacuations, when they become excessive and prostrating.*

Costiveness is best treated by enemata of warm water. Active purgatives should, if possible, be avoided, for there is a strong tendency in the inflammation which exists in the mouth, to extend to other portions of the mucous membrane lining the digestive passages. A small piece of manna, dissolved in the milk and water with which the child is fed, affords a good laxative for this condition of the bowels.

The child should be regularly accustomed to use such kind of exercise as it is capable, and if not rendered hazardous by existing diseases, taken in the open air when the weather is good; for there is scarcely anything that tends sooner to excite febrile irritation, and a disordered condition of the bowels, than close confinement within doors, particularly in cities, during the summer.

Cutaneous affections in teething children demand an especial attention. But it ought here to be remarked, that great care should be observed in the application of remedies for their removal, as fatal consequences have not unfrequently ensued from the drying up of eruptions behind the ears and on the head; they had much better be left without any other applications than such as are necessary to preserve cleanliness.

TONSILLITIS—INFLAMMATION OF THE TONSILS.

Among the parts of the digestive system which are very liable to inflammation in children, particularly after the fourth or fifth year, are those masses of mucous follicles known by the names of tonsils or amygdalæ. As their office appears to be to lubricate the upper part of the pharynx, and one of the most common inconveniences arising from their inflammation being pain in deglutition, it appears proper to class them at least as appendages to the digestive organs.

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* R Pulv. Ipecac., gr. j.
Hydr. Subm., gr. ij.
Cretæ, p. p., gr. xx. M.
Divid. in pulv. No. iv.
One may be given every three or four hours, until the discharge becomes lessened.

This disease has been known by the various names of amygdalitis, cynanche tonsillaris, angina, squinancy or squinsy, of the old medical writers. Hippocrates speaks of it; and it is also clearly described by Celsus, Aëtius and others, among the Romans. n

Etiology.—The most common cause is cold applied to the surface of the body; and it is consequently found most prevalent in damp situations, and in cold, variable climates, and at the season of the year when most atmospherical vicissitudes prevail, as the autumn and spring, especially the latter. Those children who are of a sanguineous habit of body are greatly liable to attacks of this disease; and a great predisposition to renewed attacks exists in those who have once been affected.

Semeiology.—This disease is easily recognised by the redness and tumefaction of the fauces. Where the inflammation is severe, the tonsils become exceedingly swelled, so as to impede deglutition; the uvula and soft palate appear also swelled and œdematous. When attempts are made to swallow, great pain is produced by the effort; and in severe cases of this disease, fluids are sometimes returned by the nose. The tongue is white, the papillæ being seen in red dots through it at the commencement; afterward a thick tenacious mucous covers the whole surface of this organ. As the disease advances, the clogging of the fauces by the thickened secretion, together with the enlargement of the affected part, cause a difficulty in respiration, and a total inability to swallow.

For the most part there is a great deal of fever accompanying this affection, and usually ushered in by a universal chilliness; the pulse is full and strong; the carotids beat with great force, and the face is flushed and swollen. The eyes, in violent cases, are red and prominent; and when the fever is great, the general turgescence of the brain causes a compression of the cerebral mass, and delirium ensues. The external parts of the throat and neck are greatly swelled, and give the strongest evidences of sanguineous congestion.

After the inflammation has continued for a short time, resolution, one of its most frequent terminations, takes place, and the patient recovers his strength in a few days; occasionally, however, great debility follows, and convalescence is protracted. It also frequently terminates in suppuration of one or both tonsils, which will occur even after the most prompt and decided treatment. The discharge of the pus thus accumulated, either spontaneously or by artificial means, affords immediate relief to all the urgent symptoms.

In some instances the inflammation is stationary, neither a disappearance of the tumors nor suppuration occurs, but a permanen enlargement of the tonsils remains. This, it is said, is most likely to occur in children of a scrofulous habit, and those who are predisposed to phthisis.

PATHOLOGY.—Redness, tumefaction, suppuration, and ulceration, are the anatomical characters of tonsillitis; such as have been described under the semeiology of the disease.

TREATMENT.—The antiphlogistic treatment is that which is especially demanded in this affection. In mild cases, saline purgatives,[*] warm pediluvium, rubefacient liniment to the throat, and diluents, will be all that will be required. Indeed, purgatives are highly useful in tonsillitis; and where it is necessary to administer such as will make a more decided impression on the system than those just mentioned, a few grains of calomel, followed by either of these saline cathartics. A mixture of Epsom salts and tartar emetic, so as to operate both by the bowels, and restore the healthy action to the part by its emetic effect, would in most cases be advisable. The restoration of the cutaneous secretion is also indicated; and one of the best articles for lessening febrile action in children is nitrate of potass,[†] and when combined with ipecacuanha, forms an admirable diaphoretic in mild cases.[‡] Tartar emetic, one grain in two or three ounces of water, a teaspoonful every two hours, may also be given for the same purpose. In young children, especially where there is much viscid secretion around the fauces, an emetic is highly useful, and in some cases decidedly necessary, to relieve the entrance to the respiratory passages.

In severe cases of this disease, with great febrile action and full pulse, it will be necessary to bleed from the arm. In all cases, when the disease does not yield to the remedies first mentioned, it will be proper to apply leeches to the swelling, or to scarify the inflamed tonsils. When leeches are applied, it will be necessary in young infants to draw all the blood required by a single application, for the prostration is often excessive and alarming when the bleeding is promoted by warm applications, and suffered to continue. After the bleeding has ceased, a warm poultice ought to be put around the throat; indeed, an emollient poultice is one of the best applications in ordinary cases, under all circumstances.

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[*] ℞ Infus. Ros. Co., ℥vss.
Magnes. Sulph., ʒvi.
Syrup. Lemon., ℥ss. M.
One or two teaspoonfuls every three hours.

℞ Magnes. Sulph., ʒij.
Mannæ., ℥j.
Solve in
Emuls. Amygd., ℥iv. M.
A dessert-spoonful every two hours, for a child two years old.

[†] ℞ Mucilag., ℥ij.
Potass. Nit., ʒj.
Oxymellis, ℥iss. M.
Sit linctus. A teaspoonful to be slowly dissolved.

[‡] ℞ Pulv. Ipecac., gr. iij.
" Potassæ Nit., gr. xii. M.
Ft. Pulv. No. vi.
Dose, one every three hours.

Acidulated astringent gargles have been recommended by various practitioners, but in the ordinary inflammation there can be hardly any advantage from them; and Pringle says that he never saw any good resulting from their use. Eberle, also, disapproves of their use, and recommends in their place simple warm water, acidulated with vinegar, for the purpose of removing the viscid mucus about the tonsils and palate. These astringent gargles, however, may be used with advantage, after the tonsils have suppurated, and have been opened, or have discharged spontaneously.*

When suppuration is about to take place, every means in our power should be used to effect it. Poultices should be continued externally, and the vapor of warm water frequently inhaled. As soon as the matter appears to be formed, the tumor must be opened with a lancet, rather than let the patient run the hazard of his life, by allowing the tumefaction to continue, for the suffering from the excessive swelling is sometimes very great, and the danger of perishing from suffocation imminent. In a few instances, the abscess has pointed and broken externally. In some cases, the tumefaction has been so great as to render it necessary to make an opening into the trachea; an operation which has been performed at different parts of that tube.

CYNANCHE MALIGNA.—MALIGNANT SORE THROAT.

This disease has, at times, made frightful ravages among children in different parts of Europe; and from the number of records of its history which we have received, there is no want of information relative to its symptoms, progress, and the supposed nature of the morbid changes occurring in this variety of inflammation of the tonsils and fauces. From the earliest ages in which there exists any account of medical writings, it appears to have been described in some form or other. Aretæus speaks of it; and the ulceration of the tonsils is clearly recorded by him, corresponding remarkably with the modern account of the affection.† Since the commencement of the seventeenth century, its prevalence in the southern countries of Europe, and islands of the Mediterranean, has enabled numerous authors to describe the symptoms, course, and ravages of the epidemic. During the following century, its extensive prev-

* ℞ Querci, ʒij.
Aluminis, ʒss.
Aquæ Fervent, oj.
F. Gargarisma.
℞ Tinct. Myrrhæ, ʒij.
Acid. Sulph. Dilut., ʒj.
Alumninis, gr. x.
Decoc. Hordei, oj.
Ft. Garg.

† Aretæus, de Caus. et Sig. Acut. Morb., Lib. ii.

alence throughout Europe has caused a number of accounts to be published, and many excellent essays now exist on this subject. Although not so severe, it has appeared as an epidemic in this country, and the first mention of it is in the early part of the last century.

The peculiar product of the inflammation, the pseudo-membranous formation which is poured out on the surface of the inflamed mucous membrane, has of late received much attention in France; and the description of it, principally by Bretonneau, has probably been taken from the milder form of the affection; for the term he applies to it, diphtheritis (Διφθερα, membrana), signifies an inflammation, attended with an exudation of a membranous substance, which is represented as its only peculiarity, but which, in strictness, can not always be so regarded. In some instances the pellicle may be peeled off, leaving the mucous membrane beneath, red, and free from any ulceration; but in the greatest number of instances it is found covered with an ash-colored slough, or studded with patches of gangrene,* corresponding with the malignant sore throat of earlier writers. This affection, known also by the names of angine coenneuse,† angina pseudo-membranacea, etc., ought to be considered identical with cynanche maligna.‡

Etiology.—Cynanche maligna, or ulcerated sore throat, is most prevalent in spring and autumn; and it has been thought that a damp atmosphere, or a low marshy situation, is necessary to its production; but such has not always been found to be the case; for in an epidemic in France it prevailed during a remarkably dry season, and the marshy districts were even more free from the disease than more elevated situations. It usually prevails as an epidemic. Sporadic cases of it also occur, but are in general of much less violence than when raging among a community in a town or village. It is said that it appears simultaneously among several individuals exposed to the same influence, while other members, similarly exposed, have escaped entirely, and other persons having intercourse with them have not been affected, whence it has been inferred that it is not contagious.

On the other hand, those who have been careful observers of the disease, and who have had abundant opportunities of remarking its nature and progress, strongly maintain its contagious character. M. Trousseau asserts, that one individual affected with it may introduce it into a community, and cause its spread through several individuals in every variety of its forms. Several instances of its contagious character are given by this writer,* as well as by Guersent,† Bretonneau, and others. Like most diseases of like nature, it may become communicable under peculiar circumstances, as in a state of atmosphere resulting from crowded habitations, want of cleanliness, insufficient ventilation, and other causes which may render it vitiated. These circumstances may reconcile the conflicting opinions on this subject. Those most liable to an attack of this affection are children; and when they are crowded together in close habitations, and especially when suffering from poverty and filth, are very violently and fatally affected. Yet it not unfrequently happens that numbers are attacked with it who enjoy every comfort and luxury of life.

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* Evanson and Maunsell, p. 130.

† Guersent., Dict. de Méd.

‡ V. An excellent Monograph, by Professor Geddings, of Charleston, South Carolina, on Pseudo-Membranous Inflammation of the Throat. Amer. Journ. Med. Sciences, May, 1839.

Semeiology.—This disease is very insidious in its approach. A little chilliness, languor, stiffness of the throat, are all the symptoms which precede an attack. In some instances, indeed, the child manifests no distress nor uneasiness, and, when old enough to describe his feelings, expresses no inconvenience, except a slight burning in the throat. If the fauces be examined, even at the earliest period of the disease, they will be found of a deep red, covered either partially or generally with transparent mucus. This mucus gradually increases in quantity and consistency until it has the appearance of a concrete covering, or plastering, of a grayish color, inclining to yellow. This may often be peeled off, leaving minute bloody points on the mucous membrane, which, in the milder form of the disease, is not much swollen. The pellicle at first, in detached portions, soon becomes confluent, and the whole of the fauces and mouth become lined with this thick exudation.

The color of this pseudo-membrane is at first grayish, it then becomes brown, and afterward black. The mucous membrane beneath, when it is exposed to inspection, is now found to be of a dark red, soft, and is easily made to bleed. At this stage of the affection, the cellular membrane participates in the disease, or in the irritation arising from it, and the neck and adjacent parts become swelled. Sometimes the inflammation and its effects spread to the larynx, giving rise to the secondary form of croup.

As the disease advances, or in those cases which, from the commencement, are more than usually severe, the tonsils and fauces become more swelled, and the exudation assumes a dark ash or brown color, which being thrown off in shreds, leaves the parts beneath in a sloughing condition. The sloughs rapidly extend into the substance of the tonsils and surrounding parts, while a dark-colored sanies is discharged from the nose; and vesicles, which become gangrenous, appear on the inner surface of the cheeks and tongue. The mouth is dry, dark-colored, and finally black; the gums become soft, and partake of the general disposition to slough. The tongue at first is red at its edges, and white on the surface; afterward it becomes brown or black, and dry, while small ulcerations appear on its sides. Nausea and tenderness in the epigastrium indicate the existence of gastritis in severe cases, and diarrhœa not unfrequently occurs under such circumstances.

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* Dict. de Méd., Art. Diphtherite.

† Ibid., Art. Angine Membr.

At the commencement of the disease, the febrile symptoms are often considerable, but they abate in intensity as the disease advances. The pulse becomes irregular and frequent, and a general prostration of the powers of life ensues, and the patient perishes from hemorrhage, induced by the extensive separation of the eschars, or from the exhaustion caused by the diarrhœa, which so often attends a violent attack of the disease.

It has been confounded by many writers with scarlatina. Fothergill, Cullen, Withering, Morton, Bard, and others, regard the eruption of scarlatina as a pathognomonic symptom of the disease, considering the two as identical. The scarlet eruption, however, is not necessary to the characters of malignant sore throat, as the latter often occurs without the other, and is truly an idiopathic affection: an inflammation which derives a peculiar character from some local or epidemic cause. I have very recently seen a rapidly fatal case of sporadic malignant sore throat, without any of the usual marks which characterize scarlatina, and without being able to discover any case of the latter disease in the vicinity.

The prognosis is generally unfavorable when there appears much tendency to sloughing, accompanied with great prostration of strength, or any local congestion of an important organ. If the disease has continued mild for the first week, a favorable termination may be expected. If there should arise any laryngeal or gastric inflammation, the complication gives an unfavorable prognosis.

PATHOLOGY.—Bretonneau regards the membrane, formed in the disease he denominates diphtheritis, as the result of specific inflammation; but in what it consists, he finds it difficult to say. There is doubtless an influence produced, by the operation of the epidemic causes affecting the nervous energy, by which a peculiar character is imparted to the inflammation. Naumann was of opinion that a change was wrought in the properties of the blood, by which its albumen could not be retained in solution, and it exuded on the inflamed surface.* It is a curious coincidence, also, that in this disease, according to the experiments of Donné, the secretions are highly acid; and Raspail's views are, that fibrine is only coagulated albumen from the effect of acid. The loss of the power of interstitial growth, and the derangement of the secretory function of the diseased part, and the changes wrought in the secreted matters, which give evidence of the great tendency to gangrene, show the effect of the epidemic influence on the ganglionic nerves, by which their energy is impaired, and their controlling power over the secretion of a diseased part in a measure lost.

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* Handbuck der Med. Klinik, bande iv., p. 81.

TREATMENT.—A great difference of opinion has existed as to the treatment of this disease, attributable to the different appearances the disease has assumed in the various epidemics; accordingly, where the epidemic has been marked with the predominance of inflammatory action at the commencement, bleeding has been resorted to from necessity, and the remedy considered as one of the greatest importance in the management of the disease. In individuals, too, of robust frame, in whom the invasion was attended with a vigorous action of the sanguineous system, and the usual attendants, heat and tenseness of the pulse, such cases of abstraction of blood would be the remedy most naturally suggested. Even, therefore, in the same epidemic, a difference of treatment might have been found necessary; and the opposite views of Gendron,* recommending bleeding, and those of Bretonneau, disapproving of it, may thus be reconciled.

In the early stage of the disease, especially in vigorous children of sanguineous temperament, bleeding should be practised with the lancet, together with leeches to the throat; in attacks characterized with less disturbance of the general system, and less violence of the local inflammation, blood-letting may be limited to the application of leeches to the throat. Where there exists, however, much depression of vitality, with a cool skin and feeble pulse, even at the commencement, blood-letting, in every form, should be avoided, for even the leech-bites will slough under circumstances like these.

One of the most important remedies, where there is no gastro-enteritis, is an emetic, not only for the purpose of removing the membranous formation and sloughs from the throat, but also from its general revulsive effect. Sulphate of zinc is one of the best that can be used. It may either be given alone, in doses of two or three grains in two ounces of water, by spoonfuls every ten minutes, or in combination with ipecacuanha.†

Mild aperients will be all that will be required throughout the whole of the disease, where the condition of the bowels demands the interference of art to keep them in a soluble condition. All

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[*] Note sur l'Angine couen., etc., Jour. Complimen. des Soc., Méd., t. xxx., p. 269; Paris, 1828.

[†] ℞ Sulphat. Zinci., gr. v.
Pulv., Ipecac., gr. xxv. M.
Divid. in pulv. No. v.
One every fifteen minutes.

other kinds of cathartic medicines should be avoided, on account of the great tendency to diarrhœa.*

Calomel, as a cathartic, has been strongly recommended by Dr. Jacob Ogden, formerly of Jamaica, L. I.,† Dr. Bayley,‡ and others. Bretonneau has also used it with advantage; he says it not only cleansed the throat, but produced a general subsistence of all the unfavorable symptoms. On the other hand, respectable and experienced practitioners|| have not found any advantage in the use of it. It is not only admissible in the earliest stage of the disease, and in plethoric and vigorous individuals, and where the disease has at the commencement extended to the larynx, producing symptoms which indicate the existence of croup, but throughout the entire disease.

External stimulating applications are undoubtedly useful to produce a revulsion to the surface. Any of the ordinary rubefacient liniments may be used for this purpose;§ but blisters should, under ordinary circumstances of gangrenous sore throat, never be used to the part, from the great tendency of all sores to slough; they are only admissible when there is much swelling of the throat, and after the violence of the inflammatory action has in a measure been subdued. Those who have had experience in the epidemics that have prevailed in Europe, recommend them, under the circumstances just mentioned, to be applied to the nape of the neck.

A tepid bath, at the commencement of the disease, will greatly tend to restore the equilibrium to the circulation; and the constant sponging of the body with tepid vinegar and water, while a febrile heat continues, will be found both refreshing to the patient, and tend much to the diversion of the disease, by constantly exciting the action of the cutaneous follicles. Warm sinapised pediluvia may also be repeatedly used with advantage. To allay the febrile action, the effervescing mixture of supercarbonate of soda, or potass, may be employed;¶ the latter is peculiarly soothing to an irritated stomach, and may with safety be used, when there exists much gastric irritation. Where there is gastric inflammation, cold,

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* ℞ Ol. Olivæ, ʒss.
Pulv. Acaciæ, q, s. ut fiat,
cum Aq. Fœniculi, ℥iij
emulsio, cui adde,
Mannæ, ℥j.
Syrupi, ℥ss. M.
A dessert spoonful every hour.

† V. Dr. Ogden's Letters to Mr. Hugh Gaine, "On the Malignant Sore Throat Distemper," dated 1769–1774. Republished in Med. Repos., vol. v.

‡ N. Y. Med. Repos., 2 Hex., vol. i., p. 331.—3 Hex., vol. ii., p. 345.

|| V. Roche, Art. Angine couenneuse, Dict. de Méd.

§ ℞ Aquæ Ammoniæ,
Ol. Olivar., āā. ℥j.
Tinct. Camphoræ, ℥ss.
Ol. Terebinth., ʒij. M.
ft. Linim.

¶ ℞ Potassæ Bicarb., ʒj.
Aquæ, ℥ij. M.
A dessert spoonful every two hours, mixed with Succ. Limon., ʒj.

iced drinks are much craved by the patient, and will be found highly serviceable.

This method of treatment is, of course, applicable only to those cases which possess more or less of an inflammatory action. When, however, the skin becomes cool, the pulse feeble, the inflammation of the fauces disappearing, and the part assumes a dark, gangrenous appearance, it will be necessary to resort to such measures as will restore energy to the system;[*] as ammonia, camphor, wine whey, snake-root in infusion,[†] mineral acids,[‡] etc. This course of treatment must only be adopted when there is a decided sinking of the system, and the disease has assumed the gangrenous form. And when it is necessary to adopt a more tonic course, sulphate of quinine, enemata of infusion of bark and camphor,[||] may be required; the latter especially, where there still exists much gastric irritation. When it is thought advisable to give it by the mouth, in severe forms of the disease, with great loss of vitality, it may be administered according to the annexed formula. As a powerful and efficient stimulant, a mixture of capsicum and salt has been used with great benefit.[§]

To cleanse the throat, and stimulate the ulcerated surface to a new action, stimulating and detergent gargles have been long in use[¶] When, however, sloughing has actually taken place, cauterizing the affected part becomes indispensable; and the best method of effecting this is by means of a pencil of lunar caustic, or the powder applied to the part with a pledget of lint, covered with some glutinous substance, to which the nitrate of silver will adhere; or a pledget on the extremity of a probe may be saturated with a solution, composed of twenty grains of nitrate of silver to an ounce of water, with which the part should be touched two or three times a day. Muriatic acid has also been used for the same purpose.[**]

[*] ℞ Ammoniæ Carb., gr. viij.
Mist. Acaciæ,
Syrup. Simpl., āā. ʒss.
Aquæ, ʒiv. M.
A teaspoonful every two hours.

[†] ℞ Rad. Serpent., ʒiss.—ʒiij.
Inf. in s. q. Aq. per ½ hr.
Colatur., ℥iv. refrig.
Adde,
Syrup. Aurant., ℥j, M.
A tablespoonful every hour.

[‡] ℞ Acid. Sulph. dil., ʒss.—ʒj.
Aquæ, iv.
Syrupi, ʒj. M.
A tablespoonful three or four times a day.

[||] ℞ Cort. Cinch, ʒij.
Aquæ, ʒiij.
Aq. Camphor, ʒss. M.
ft. enema.

[§] ℞ Capsici, ʒiij.
Sodæ Mur., ʒij.
Aquæ Fervent., ℥viij.
deinde Adde,
Aceti, ℥viij. M.
A teaspoonful every hour.

[¶] ℞ Herbiæ Salviæ, ℥ss.
Inf. Aquæ Fervid, q. s.
Colatur, ℥viij.
Acid. Hydrochlorici, ʒiss.
Syrup. ℥ij. M. m

[**] Guimier. Mém. sur un Epidem. d'Angine Malig., &c., Journ. Gén. de Méd.; Paris, 1828.—Guersent, art. Ang. Gang., Dict. de Méd.

Nitrate of silver is decidedly the best for general use, as but little irritation is left after the formation of the eschar by its use. Alum, chloride of soda, sulphate of copper, sulphate of zinc,[*] have each in their turn been found of great efficacy as escharotics or stimulants, according to the strength in which they are employed. Guersent and Bretonneau speak very highly of alum; and Guersent has used chloride of soda, or the borate of soda, with decided advantage. Dr. Geddings suggests the use of creosote, properly diluted, as an escharotic. He also mentions that tincture of cantharides, either pure or diluted with one half or two thirds of water, has been used by him, injected into the throat by means of a syringe, when the patient is unable to swallow.

PAROTITIS.—MUMPS.

As an appendage to the digestive system, the inflammation affecting the parotid gland in children next comes under consideration. The mumps is a disease which few children escape, and having once been affected with it, rarely, if ever, have a second attack. It is for the most part a trifling affection, scarcely ever demanding much interference.

Etiology.—Inflammation of the parotid gland may be produced by the causes which usually develop inflammatory affections; such as exposure to cold, wet feet, or damp bed-clothes, in those who are predisposed by a sanguineous temperament to inflammatory diseases. Besides arising sporadically, it may also prevail as an epidemic, when it is manifestly contagious, spreading through a family when once introduced, few if any of those who have not before been affected escaping its influence.

Semeiology.—The disease first appears as a swelling, either on one or both sides, in the vicinity of the ear. When it first shows itself it is evidently confined to the parotid gland, as it is moveable. The cellular tissue is then involved, and a large swelling occupies the region around the angle of the jaw and cheek. When severe, it extends sometimes to the maxillary glands, causing a good deal of uneasiness, but scarcely ever producing severe pain. It usually passes through its stage of increase in four days; after that period it gradually declines.

In the greatest number of instances it is a very mild disease, attended with but few marks of inflammation of the part, other than tumefaction, with no attendant fever. At other times, especially

[*] ℞ Zinci. Sulph., ʒj.
Infus. Salviæ., ʒij.
Mellis Rosæ, ℥j. M.
ft. Linctus.

when the neighboring glands are involved, its symptoms are more violent, inflammation is more severe, the fever is high, with a great determination to the brain, as appears from delirium and other cerebral affections, which, it is said by Dr. Cullen, have proved fatal. This latter symptom, it has been remarked, is more likely to occur, where the disease passes through its course without exhibiting the peculiar sympathetic affection of a transfer of inflammation to the testes, or mammæ; a symptom very commonly occurring when it is first on its wane.

Although, in the greatest number of instances, the local inflammation is but light, yet it has at times been so severe as to terminate in suppuration of the parotid, tonsils, and neighboring parts, or even in scirrhus; the latter, however, is rare in young subjects, as is also the occasional termination in chronic and malignant diseases of the part, which have been observed in old persons.

Treatment.—It is in most cases so slight as scarcely to require any other treatment than a gentle cathartic, pediluvium, and the application of some stimulating liniment to the skin of the affected part. This, with abstinence, will usually abate the inflammation, and facilitate the natural tendency of the disease to resolution.

When the local inflammation is severe, and the accompanying fever violent, with a determination to the brain, venesection must be resorted to, with active cathartics and diaphoretics; and when the violence of the constitutional symptoms has been in some degree subdued, a blister should be applied behind the ear. The local abstraction of blood, by means of leeches, should never be omitted when the symptoms of inflammation are violent; and even when there exists no febrile action, they ought to be used, if the violence of the local inflammation threatens the formation of an abscess. After these, a fomentation of hops will be found useful in allaying the local nervous excitement, which often greatly influences inflammatory action. Where the termination of the inflammation is evidently tending to an abscess, notwithstanding the measures adopted for subduing it, the secretion of pus must be promoted, by the application of soft poultices of bread and milk, or slippery elm.

On the disappearance of the disease, the bowels should be kept free, to prevent the translation of the disease to other organs; this, however, need not be feared, where proper measures are employed in the course of the affection.

ŒSOPHAGITIS.—INFLAMMATION OF THE ŒSOPHAGUS.

Œsophagitis is a disease of much greater frequency in young infants than is generally supposed. It occurs more frequently in them than in adults, and is probably often the cause of vomiting. Indeed, it is in the latter of rare occurrence, and is caused by the introduction of some irritating or corroding poison; but in the infant it is a disease peculiar to the period of life, arising from the natural congenital predisposition of the part to inflammatory action. It is an affection often overlooked or confounded with some other disease.

Etiology.—The congenital congestion of the œsophageal canal in newborn infants, as appears from modern dissections, is one of the predisposing causes of this affection, and is on this account, as was before observed, of much greater frequency than in adults. The exciting causes are principally the high temperature of drinks or food which the child takes. It not unfrequently arises from heated milk, panada, or other food, which is given to an infant artificially nourished; and it is easily conceived how this organ, predisposed by sanguineous congestion, may become by these means seriously inflamed.

Semeiology.—One of the most prominent symptoms of œsophagitis in infants, is the vomiting of the milk immediately on swallowing. From the pain arising on swallowing the child refuses the breast, and becomes rapidly emaciated for want of nourishment. Not unfrequently other matters which come from the stomach are vomited, beside the milk which the child takes; when this is the case, there is probably an extension of the inflammation toward the stomach. The cause of the incessant vomiting in œsophagitis is doubtless owing to the contractions arising from the stimulation of the part by food.

It is not an easy matter to distinguish this affection from diseases of the stomach, for the symptoms are few in number, and are generally similar to those which characterize inflammations of the gastric organ, such as refusal of the breast, vomiting after deglutition, and emaciation. Yet it may be suspected, if the vomiting occur immediately after an attempt at deglutition, and that the substances vomited exhibit no alteration; the milk given, shows no change in its character, such as is usual to find after it has been submitted to the action of the gastric secretion. Another method of detecting the existence of this disease, is the pain produced upon pressing along the track of the œsophagus, by which the cries of the child may be excited; this is indeed the only way we have of ascertaining the existence of pain, for children at the age at which they are usually the subjects of this affection, are unable to indicate its presence in any other way.

In the case of stomatitis extending toward the fauces, we may have every reason for believing that the progress of the inflammation on the continuous membrane may not be arrested before it reach the œsophagus; and in the different varieties of this affection, the œsophagus may also become affected, and its existence should be suspected when vomiting supervenes on the other symptoms.

Morbid Anatomy.—The anatomical characters of this disease do not differ materially from those of stomatitis. The habitual congestion of the œsophagus in newborn children, might sometimes lead to an error in supposing this canal to be inflamed, when it is really not in that pathological condition. When œsophagitis exists, there is almost always present some lesion by which the disease will be sufficiently identified, such as a destruction of the epithelium, ulcerations, and a peculiar carmine hue of the whole tract. The surface of the mucous membrane is sometimes found covered with the concrete exudation found in stomatitis. The pharynx is usually much injected; the glottis infiltrated and red. Besides the separation of the epithelium, often in large shreds, several red, and sometimes black striæ exist, where the epithelium is not destroyed. Extensive ulcerations, also, have been found after a violent case of œsophagitis, characterized during life by the extreme obstinacy of the vomiting. Large irregular eschars, of a soot black color, with intervals of deep bright red excoriations, the eschars diffusing the pecular odor of gangrenous parts, have also been revealed on dissection. Some portions of the œsophagus have been found in a state of gelatinous softness, and apparently at the point of being perforated.

Treatment.—Abstinence from the exciting causes is the first step in the treatment of œsophagitis; this is more especially to be mentioned, from the great danger of disregarding the temperature of the drinks which must at all times be given to the infant for nourishment. Hot and stimulating drinks should therefore be carefully avoided, and but small quantities given at a time, and at the temperature of breast milk. A mild aperient should be given, and its operation promoted by enemata. An emollient cataplasm ought to be applied to the throat, and in violent cases, a leech or two in the vicinity of the affected part, followed by a poultice. Mucilages ought then to be freely given, and, if possible, in such a manner as to keep the surface of the œsophagus continually coated. The slippery elm, as advised in the preceding section on stomatitis, will be one of the most useful forms in which they can be administered.

DISEASES OF THE STOMACH AND INTESTINES.

It is a well-established axiom in physiology, that in proportion to the vigor with which an organ discharges its peculiar functions, is it liable to be deranged in its healthy action; the more it is exercised, the more it is disposed to disease. The organs most in active exercise in children, are those concerned in digestion, and their derangements are the affections for which the physician is most frequently called to prescribe; indeed, so common are they, that almost all the diseases of infancy have been referred to a disordered or ascessant condition of the digestive organs, as their original cause, by many authors. Van Helmont, Baglivi, Cheyne, Baumes, Gardien, Sablairoles, Senn, Denis, and others, have regarded the digestive system of infants as the foundation of their various affections. The celebrated and learned English physician Harris, considered the ascessant state of the stomach as the cause of every disease in infants.*

The stomach and bowels may be disordered in their functions, simply from an altered action in the organs themselves, or from some disease tending to a change or destruction of their tissue, or they may be affected by sympathy with a distant part, as the head, lungs, skin, etc. From whatever cause these affections may arise, they can not long continue, without becoming hazardous to the life of the young being, in whom the digestive and nutritive process are the principal functions, and the interruption of which at once arrests its growth, and deranges the harmony of action dependant on the general and simultaneous development of all its parts.

The idiopathic functional disorders and organic affections of the digestive system, will now be considered; and such as arise from mere sympathy with other parts, will be left to be discussed when the diseases of which they are but the symptoms are considered.

INDIGESTION.

ETIOLOGY.—In sucking infants, indigestion usually arises from the acrid and irritating quality of the nurse's milk; it also arises from an inadequate supply, or a deficiency or excess of the nutritious qualities of the milk. In the former case the quantity is often not diminished, but its nature is changed, and it becomes a constant source of irritation to the tender mucous membrane, instead of affording a bland nourishment.

One of the causes of this change is diet. The milk of the female of all tribes of animals is affected by this cause, and an alteration in its nature and qualities will arise from a change made in the food. Experiments have been made on the suckling bitch, by substituting vegetable substances for the natural nourishment. Milk yielded by the animal under this change acquired all the properties of milk secreted by the ruminantia, readily undergoing spontaneous separation, and coagulable by the usual agents. The same animal was fed with raw flesh alone: the effect of this was soon apparent in the diminished quantity of milk, in its decided alkalescent properties, and in its resistance of spontaneous coagulation.* Here we have a striking evidence of the change effected on the lacteal secretion by the alteration in the food alone; how much more liable must the human female be to a change in this secretion, whose diet is so variable, and who is exposed to so many other causes which materially influence the process of digestion!

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* De Morbis Acutis Infantum, by Walter Harris, M. D.; Lond., 1689, p. 22.

Indolence and luxury very materially vitiate the qualities of milk, as is evident in daily observation. Too free indulgence in eating is a frequent cause of a diminished quantity, or an altered quality of the milk in wet nurses, who seldom possess that affection for their little charge which would cause them to deny and regulate their appetite, that the milk may be less heating and less irritating. The use of stimulating liquids is also common among them; and although there may not be sufficient used to cause ebriety, yet the secretions are always more or less impaired by a too frequent resort to stimulants, under the idea that the condition of the nurse, while suckling, needs the invigorating influence of alcoholic drinks.

Another cause is the age of the milk. When, from necessity, a child recently born is nursed by a female who has been delivered some months, the infant rarely thrives, its digestive powers not being sufficiently vigorous to digest the milk abounding in nutritious qualities, as it almost always does at this period; for after the fourth or fifth month, the relative proportion of the sugar and caseous matter is considerably increased, and a proportionate increase of vigor in the digestive system is requisite to carry on the process of nutrition.

From a number of experiments made by M. Payen† on the physical and chemical properties of milk, it appears that its density generally increases with the remoteness from the time of parturition, and that the relative proportion of caseum was increased one third in a female eighteen months after confinement.

The child may also suffer from the same cause, even when nursed by the mother from birth, from being suckled too long; for after a year, the milk has undergone a considerable change. It may also exhibit the effects of protracted suckling, even at an earlier period than this. The effects of long-continued lactation are said to extend much further than the digestive system; and it has been remarked that cerebral affections will arise from this cause. The digestive organs, however, are always the first to suffer from deterioration of the milk, arising from whatever cause it may.

The return of the catamenial discharge will also produce an alteration in the qualities of the milk, and thus be a cause of suffering to the child. Purging is a very uniform effect of suckling while menstruating; the alvine evacuations also being remarkable for their fetor. It appears to arise from the milk being overcharged with salts, and deprived of its nutritious ingredients, by which it acquires purgative qualities. M. Retzius has detected free phosphoric and lactic acids in the coloring matter of the menstruous blood. Milk, therefore, during menstruation, is deprived of some of its important constituents. The excitement of the uterine system, arising from pregnancy, will also alter the qualities of the milk. A child, therefore, should never be nursed under circumstances where nature has so evidently pointed out the course to be pursued by the alteration and deterioration of the milk.

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* V. Kenedy on the Management of Children; Glasgow, 1825, p. 80.

† Journal de Chim. Médicale, de Pharm., etc., March, 1828, p. 118.

A passionate or irritable temper, frequently indulged, is also another cause of the vitiation of the milk; so also is anxiety, grief, or any mental distress or preying affliction. Even a nervous temperament, by which a woman is predisposed to mental excitement from slight causes, will not fail to alter the qualities of the milk. Disease in every form has doubtless an immediate effect on the secretion of milk, and in acute diseases it is almost entirely suspended; but the alterations it undergoes in its constituent principles have not yet been ascertained by experiments. The milk of the cow in tuberculous consumption has been analyzed, and found to contain a large portion of phosphate of lime. This may probably be the case with other mamiferous animals, and certainly demands the attention of physicians, both as regards the fact in relation to the human female, as well as the effect of this salt upon the digestion of young infants.

Indigestion may also occur from too violent exercise given to the infant immediately after sucking, by the common practice of jolting on the knee. Rest, for some time after eating, is a dictate of nature, observed by all animals at every age; the influence of the necessary nervous energy should in no wise be diverted from its proper place of action.

The irritability of teething may be a cause of indigestion, and predispose the child to the disagreement of the food; or rather, the change in the digestive system generally, arising from the development of the muciparous glands, which at this period are greatly enlarged and highly sensitive.

As the child advances in age, one of the most frequent causes of this disease is improper food of an artificial kind, the tender and highly sensitive mucous membrane being easily excited by such kinds of food as possess much irritating qualities. A sudden change, also, from the bland food furnished by the breast, to any substantial aliment, will almost always be followed by a great disorder of the digestive organs and bowels; while a gradual change to the same kind of food will not usually be followed by similar consequences.* There is also an error very often committed, of giving the child too much food. Indeed, there are few children injured by abstinence, but thousands are made sick by over feeding. The digestive organs are taxed beyond their ability, and the child, instead of thriving under the load of nourishment, pines away, and at last falls a victim to the mistaken attentions of its nurses. These are most likely to occur at the usual time of weaning, by the change in the food at this period, and have been long known in England by the popular name of weaning brash.

Among the most indigestible articles for children, are dried and preserved fruits and confectionary, of which children are remarkably fond, The smallest quantities of these articles are not free from danger, for convulsions have been caused by the irritation produced after eating a few raisins. All fruits, whether fresh or dried, with a thick skin, are injurious to children. The seeds also form an additional source of injury to the mucous membrane of the digestive organs. Therefore, fruits abounding in hard seeds, where these are necessarily eaten with the pulp, as currants, grapes, blackberries, etc., should be avoided.

Unripe fruits of every kind are particularly injurious, and are scarcely ever digested, both from the hard and unyielding nature of the parenchyma, and from the acid with which they abound. Whenever they are much used, colic and diarrhœa, the latter often becoming chronic, with inflammation of the mucous membrane of the intestines, are almost certain to ensue.

Of ripe fruits, pears and plums are the most indigestible, the pulp often remaining for a long time undigested in the stomach. Cherries, particularly, on account of the skin, are less digestible than many fruits; and even the sweetest kinds contain a quantity of acid, which makes them generally objectionable for children, especially those that are delicate. The membranous part of oranges should never be allowed to be eaten, it being almost insoluble in the gastric fluid.

Esculent roots, such as are used for food, as carrots and turnips, are rarely injurious; but those that are used merely as condiments, as onions, garlic, horse-radish, radishes, etc., almost always cause indigestion, colic, and flatulency, in children who are unaccustomed to their use.

SEMEIOLOGY.—The first symptom of indigestion in infants at the breast, is a paleness of the face, with peevishness and fretfulness. They cry continually until they are placed at the breast, when they suck with greediness, without, however, appearing to have their hunger appeased. Far from thriving with the nourishment they receive, the more they receive, the more they suffer from indigestion, frequently vomiting their milk in a curdled state, a symptom very common in young infants, when there exists an excess of acid. Under these circumstances, there is formed a complete curd, more or less dense, according to the degree of acidity in the stomach. At other times there may exist vomiting, with deficiency of acid. In this case the milk is generally returned unchanged, and the vomiting is almost always attended with nausea, as is evident from the paleness of the face, and the efforts to resist the vomiting.

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* Indigestion from this cause has been very elaborately considered by Dr. John Cheyne, under the name of Atrophia ablactatorum: Essays on Diseases of Children; Edinburgh, 1802.

In all the symptoms there is a remarkable absence of inflammatory action, the children sinking from inanition, and dying apparently from starvation. Such cases are more frequently seen in the foundling hospitals in Europe, where the mortality from this cause is very great.

In those cases where indigestion arises from improper artificial nourishment, given to the child either before or at the time of weaning, nature in the first instance makes an effort to relieve the system, and vomiting and purging are usually found to exist at the commencement of indigestion, from improper food, or from food taken in inordinate quantity. Colic and spasm not unfrequently attend indigestion, and convulsions may often result from the sympathetic irritation caused by the presence of indigestible matters.

Colic is a very distressing symptom, and in some infants will occur daily for a long period; the violence of their cries, and the writhings and contractions of their limbs, attest the severity of their sufferings. When violent or long continued, it is attended with evident flatulency, and a tympanitic condition of the abdomen. There is also evident acidity in the primæ viæ as appears both from the odor of the breath, and the green color of the stools; the evacuations of which, as well as the discharge of gas, either passing with them, or by eructations, will almost always relieve a paroxysm of colic.

The immediate cause of the pain is the distension of the intestine by gas, produced, doubtless, by some obstruction to the passage of the contents of the bowels. The opinion of Dr. Abercrombie as to the cause of this obstruction, appears, in the generality of cases in young children, to be the true explanation, if we may judge from the effects of the remedies which are usually successful in its treatment. He refers the condition of the intestine to atony, or loss of power in the muscular fibre in the part affected, while the parts above and below it still retain their normal action. His inference is, that the part beneath the distended portion is merely collapsed, and not in a state of spasm, and is not the seat of the pain; but that the portion which suffers over distension, from the accumulations in it, is the part which is the seat of the distress.[*] There are cases, doubtless of spasm of some portion of the intestinal tube, for the acrid matters, by their irritation, will sometimes produce a contraction of the muscular fibre; but it does not follow that this spasmodic contraction of the muscular fibre is always essential to the disease, as Dr. Cullen has maintained it to be in all cases. From the relief usually obtained by the use of mild stimulants in the colic of infants, and which have become so popular, as in many instances to be wrongly applied, it would appear that the loss of power in the muscular coat was the real cause of the distressing colic pain. The truth probably lies between the two; and although, in the generality of cases, this pain in infants may be regarded as arising from the relaxed condition of the muscular fibre of some particular portion, yet it may be complicated with a spasmodic action, and dependant on this condition, either altogether or in part,of the adjoining portion.

Colic may arise from other causes than indigestion and flatulency, as inflammation, invagination, hernia, or imperforation of the anus in new-born infants. The diagnosis may be in general easily made, with a little care. The absence of fever, the relief of the pain by pressure, and the natural state of the pulse, together with the absence of the peculiarly painful expression of face which attends inflammation of the bowels, will enable us to distinguish colic from enteritis.

Should improper food, or an inordinate quantity of appropriate food be continued, the undigested matters will pass into the bowels unaltered, causing the form of diarrhœa known by the name of lientery, and considered by authors as a distinct disease. In these cases the undigested aliment becomes an irritant to the delicate mucous membrane, by which the peristaltic motion of the bowels is increased, and their contents rapidly urged forward. It is so clearly one of the symptoms of indigestion, and depending on that disease for its existence, that it is not, on this account, here regarded in any other light.

After the irritation of the bowels has once been excited in children that have been recently weaned, and subjected to a new kind of food, it may continue until other organs are involved. The liver especially becomes disordered in its functions, and the alvine discharges exhibit the presence of bile, varying in color from a yellow to a grass green. This condition of the liver, being doubtless caused by the change of food, becoming a violent stimulant to the upper portions of the intestines, and the transmission of irritation by continuity of tissue. If this had been an accidental or transitory irritation, the affection would have cured itself; but the frequent repetition of the irritating cause keeps up the disease, and prevents the liver from discharging its normal functions.* Should the food which causes these symptoms of indigestion be still given to the child, the skin will become dry, the abdomen tumid, the vomiting and purging incessant, while rapid emaciation takes place. The child is remarkably fretful, and apparently suffers from pain, but is usually too young to express the sensation. The tongue for the most part is clean and moist, or is covered with a slight coating of white secretion, which often assumes the form of the concrete exudation, so common in stomatitis.

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[*] Pathological and Practical Researches on the Diseases of the Stomach and Intestinal Canal: London, 1818.

Although purging is a very common attendant on severe cases of indigestion, yet it often alternates with a constipated condition. This latter symptom has been remarked to occur a few days before death.

Indigestion is sometimes protracted for a month or more, when the child becomes excessively emaciated, and dies from exhaustion, produced by the incessant action of the bowels.

MORBID ANATOMY AND PATHOLOGY.—Traces of inflammation are rarely found in the stomach or bowels. On the contrary, they are in an exsanguined state, and even transparent, while some portions of the intestines are much distended with gas. The mucous membrane is without color through its whole extent, and is found softened; an alteration which may occur without inflammation. Although there may have been seen in some instances traces of inflammation, yet the white softening is the most frequent alteration.† In addition to the gas, with which the intestines are distended, there is often found in them a quantity of white frothy matters.

The want of color is almost always the first degree of a species of softening, which should not be confounded with the effects of inflammation. The disease described by M. Cruveilhier, under the name of gelatiniform disorganization of the mucous membrane of infants, would appear, from the detail of symptoms, to be a violent species of the disease now under consideration.‡ M. Dugès, in his Manuel d'Accouchemens, in speaking of a similar affection, remarks that he has found the interior coat of the intestines covered with a white mucus, of a pulpy consistence, and bearing a resemblance to imperfect chyle, and which inattentive observers might mistake for the softened mucous membrane. The mucous follicles, he observes, could be still seen on the intestinal surface.

The traces of red color which are sometimes found in the intestines of very young infants, who perish with all the symptoms of want of nutrition, are nothing more than the normal change arising from the natural congestion of the part; a condition always existing in them, as noticed by the French pathologists.

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* Cheyne, Second Dissertation, p. 25.

† Billard, Diseases of Infants, p. 289.

‡ Loc. Cit.

In the indigestion occurring at the time of weaning, and described by Dr. Cheyne under the name of atrophia *ablactatorum*, the intestines in every instance were found in a state of intussusception; and that it was spasmodic, and not inflammatory in its nature, was evident from the ease with which the contained part of the intestines was disengaged from the portion which formed the sac. In addition to these appearances, the liver was remarkably firm, larger than natural, and of a bright red color, and the gall-bladder, much enlarged, contained green bile.*

TREATMENT.—When it is discovered that the milk of the nurse disagrees with the child, a careful attention to her diet becomes necessary; and all such articles as are observed to disagree with the stomach must be rejected as food, for an imperfect assimilation will ensue, and the milk will necessarily partake of the change. It is difficult to point out strictly those which should always be avoided; but as a general rule, she should shun the use of all ascessant fruits, fruits preserved in vinegar, cabbage, cheese, etc.; and also, by diminishing the quantity of food taken when the appetite is good, allay the slight febrile action that may arise, which diminishes and impairs the secretion of milk. It not unfrequently occurs where the appetite is good, and freely indulged, without any symptoms of indigestion arising; an excited state of the blood-vessels will take place, a condition uniformly connected with diminished secretion. So, also, all stimulating liquors, so frequently given to promote the secretion of milk, ought to be avoided, except under peculiar circumstances of debility. Abstinence, therefore, will often, in robust individuals, who freely indulge their appetite, be a means of promoting the secretion of milk; and where there exist the ordinary symptoms of plethora, such as fulness about the head, headache, or a frequent full pulse, it may be necessary to abstract blood by the lancet, and to administer a purgative. These means, joined to the use of a light diet, consisting principally of well-boiled farinaceous substances and milk, will often restore the secretion, and impart to it the proper consistency.

Where, on the contrary, there exists a general debility of the system, without any organic affection, a stimulating diet may be necessary. This, however, is seldom the case; a too great eagerness for over feeding is the usual fault with nurses, and there is scarcely a necessity on the part of the medical attendant for prescribing this course.

In the treatment of indigestion from weaning, Dr. Cheyne relied mainly on small doses of calomel, half a grain night and morning, preventing its too powerful operation on the bowels by enemata of laudanum.

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* Cheyne, Op. Cit., p. 22, et. seq.

One of the most common attendants on indigestion is vomiting, accompanied in most cases by acidity of the stomach, flatulency, pain, and sometimes diarrhœa.

When obstinate vomiting arises from the bad quality of the milk, occurring immediately on the child's sucking, nothing but an improvement of the milk, or some permanent change, either by the employment of another nurse, or the adoption of another kind of food, will be necessary. As was before remarked, the protracted lactation and the disorder of the system, from the action of the uterus, arising either from the return of the menses or pregnancy, will produce an alteration in the quality of the milk. It has been remarked that nurses who are subject to nervous affections, secrete milk having the appearance of the white of an egg.

Although acid is generally present in the matter vomited by young infants, yet there are instances in which this appears to be unconnected with the vomiting; but an irritated state of the stomach is the only cause to which it can be assigned. In such cases, ipecacuanha and rhubarb will be found a valuable prescription.* Dr. Eberle recommends small doses of calomel and ipecacuanha to allay gastric irritability,† in conjunction with a stimulating poultice or plaster to the epigastrium. This may be made with mustard in flour, mixed with rye meal or wheat flour, and is one of the most efficient counter-irritants. The effect of the application of mustard should be carefully watched, for very severe cutaneous inflammation may be the result of allowing the mustard to remain on too long; blistering and sphacelation have also sometimes followed a careless application of sinapisms. From fifteen to twenty minutes is the proper time for the mustard poultice to remain on; and, in children of great irritability, a piece of fine gauze ought to be interposed. Where it is not deemed necessary to produce a speedy impression by the use of these stimulating poultices, an ordinary poultice may be mixed with a small quantity of the powdered mustard, in the proportion of about four ounces of the former to a drachm or two of the latter; or flannels may be dipped in a weak infusion of mustard, and applied over the stomach. Should there be much inflammation or pain following the application of mustard, a little fresh cream or mucilage of slippery elm may be applied to allay their violence. One of the best means of treating this affection, in addition to the means already mentioned, is by producing a revulsion on the lower portion of the intestines, by means of stimulating enemata; half a teaspoonful of salt, in a gill of warm water, is an excellent one for this purpose. Dr. Eberle speaks highly of the use of morphia, applied externally, by means of simple cerate; one or two grains of the former, mixed with a plaster of the latter, will often have a sufficient narcotic influence to allay this morbid vomiting, arising from an inordinate irritability in the mucous membrane of the stomach.

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* ℞ Pulv. Ipecac., gr. j.
Pulv. Rhei., gr. xij. M.
Divid. in Pulv. No. iv.
One three times a day.

† ℞ Hydr. Subm., gr. iss.
Pulv. Ipecac., gr. j. M.
Divid. in Pulv. No. vi.
One every hour or two.

Vomiting may also occur when there exists a deficiency of acid in the stomach. It is well known that there is always present, during healthy digestion, a quantity of free acid, which, according to the experiments of Beaumont and Lauret, is the hydro-chloric. From the uniformity of its existence, and from the suspension of the process of digestion, by the neutralization of this acid, it would appear to be necessary to healthy digestion. When there exists a deficiency of acid, it may be known by the milk remaining a long time in the stomach before it is vomited; the child in the mean time exhibiting every sign of nausea, and discharging the milk in an unchanged condition. A few drops of hydro-chloric acid, in a little water, will be found a very efficient remedy, as it supplies the deficiency of the natural acid; and in cases where the experiment has been tried in adults, the restoration of the process of digestion, which has been arrested by neutralizing the acid, was quickly affected by administering it. Lemonade is also an excellent prescription in such cases. Madeira wine, either diluted, or in the form of whey, will also be found to be highly beneficial, especially where there is any debility or depression of the system.

Often the matters ejected will possess a decided acid odor, and the child will not be relieved by the vomiting, but continue pale and distressed. When these symptoms are present, there is probably some caseous matter still remaining in the stomach, and a gentle emetic of ipecacuanha will be necessary to remove it. Very distressing symptoms often arise from this cheesy matter remaining undigested. The emetic should be followed by a small dose of calomel, when there is evidence of a derangement of the biliary secretion or the hydrargyrum cum cretâ, which may, in cases of great irritability of the bowels, and tendency to diarrhœa, be combined with Dover's powder.

Vomiting, occurring in those children who have been either overfed, or who have been fed with improper food, is generally attended with a quantity of acid. Under these circumstances it will be necessary to change the food, and where the child is weaned, to mix some prepared arrow-root or barley with almost any kind of weak broth. Barley water, in which gum arabic is dissolved, or milk diluted with rice water, and combined with a small quantity of chicken water, or other weak solution of animal substances, will arrest the tendency to acidity arising in those children who are fed principally on milk or farinaceous substances.

Lime water, mixed with an equal quantity of milk, a teaspoonful of which to be given every half hour, I have found to be the best to allay inordinate vomiting, arising from the existence of acidity in the stomach. Where there exists costiveness, magnesia is the most proper antacid that can be administered, and especially when combined with super-carbonate of soda.[*]

After the contents of the bowels have been removed, the irritability of the stomach may be calmed by a little tincture of opium or tincture of camphor.[†]

In the indigestion of children there not unfrequently exists a severe purging, which it will be necessary to arrest; and this should be done by astringent and anodyne remedies, if the composing mixture just mentioned for an irritable stomach should fail in effecting it.[‡] An anodyne enema may first be tried, made with two or four drops of the tincture of opium in two ounces of prepared starch, or infusion of flaxseed.

External stimulation of the abdomen is a very valuable auxiliary to the treatment, effected either by simple friction with the hand, or by means of heated flannel or warm spirits; if the latter be used, care should be taken, by sufficiently covering the part, to prevent evaporation, otherwise the object would be defeated, and cold applied instead of heat.

For the relief of a paroxysm of colic, in addition to the general principles detailed for the treatment of indigestion, on which it depends, it will be necessary more especially to resort to the use of those remedies which will remove the more immediate cause of the affection; such as small and repeated doses of magnesia, should acidity be evidently, as it in most cases is, connected with it. And where it appears to be dependant on debility in the organs of digestion, a mild stimulant will often be found the best remedy for its relief, as an infusion of catnip, fennel, or aniseseed. These may advantageously be combined with an antacid. Dr. Eberle advises twenty grains of bi-carbonate of soda, dissolved in an infusion of valerian root, in the proportion of one ounce to a pint, with a drachm or two of ginger syrup; a teaspoonful of which may be given several times a day, to an infant from one to three months old; or the annexed formulæ may be used.[*] In violent and sudden attacks of pain, it will be necessary to resort to remedies which will afford more prompt relief; that recommended by Dr. Dewees is one of the most effectual.[†] An enema of an infusion of catnip or camomile flowers will often give immediate relief to a paroxysm of colic, or a laxative one with tincture of assafætida. Fomentation of warm water applied to the abdomen, or immersing the feet in warm water, will also be found useful adjuncts to the general treatment.

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[*] ℞ Magn. Calc., gr. x.
Sup. C. Sodæ, gr. v.
Sacchar. Albi, q. s. M.
ft. Pulv. No. iv.
One to be given every three or four hours.

[†] ℞ Camphoræ, gr. ss.
Mucil. g. Acaciæ, ℥ij.
Vini Opii, gt. i.—ij. M.
A teaspoonful every hour or two.

[‡] ℞ Aq. Cinnam., ℥j.
Mist Cretæ, ℥ss.
Tinct. Kino, ʒij.
" Opii, gtts. viij.
m Syrup. Simpl., ʒij. M.
One or two teaspoonfuls every hours, until the purging be checked.

It has been made a serious question with some physicians, whether in case of the inability of the mother to nurse her infant, an artificial course of feeding is not preferable to the employment of a wet nurse. Baldini, in Italy, Betzski, in Russia, Raulin, Désessarts, in France, citing the custom of the Scythians among the ancients, and that of the Russians and Danes among the moderns, have decided in favor of the artificial method.[‡] Armstrong, also, after having for a number of years filled the office of physician to an institution where many infants were received, in London, recommended the nourishing the infant by the spoon. On the other hand, Thouret, Auvity, and others, have maintained that the natural feeding possesses incalculable advantages over the artificial, from a number of experiments made in public hospitals. There can scarcely exist a doubt as to the advantage of a proper wet nurse over the other method, as the nourishment she can afford possesses the closest resemblance to that which should constitute the nourishment of an infant.

When it becomes necessary to remove the infant from the mother's breast, care should be taken in the selection of a healthy young woman to take the situation of nurse. The best nurses are those who possess all the evidences of good health. The tongue clean, teeth and gums sound, indicating healthy digestion. The breath free from any unpleasant odor. The surface of her body free from eruptions, and the insensible perspiration inoffensive. Her breasts smooth, firm, and prominent; the nipples well developed, rosy colored, and easily swelling when excited. The milk should flow easily, be thin, bland, of a bluish teint, and of a sweet taste; and when allowed to remain undisturbed, be covered with considerable cream.

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[*] ℞ Magnesiæ, gr. iij.
Sem. Anisi. Cont.,
Sem. Fœnic. Cont., āā gr. ij.
Croci, gr. j.
Sacchar. Alb., gr. vij.
One half to be given at once, and the remainder in half an hour.
℞ Magnes., gr. xv.
Pulv. Rhei., ℈j.
Aquæ Fœniculi, ℥iss.
Syrup. Rhei., ℥ss.
A teaspoonful three or four times a day.

[†] ℞ Magn. Calcin., ℈j.
Tinct. Assafœtid., gt. lx.
Tinct. Opii., gt. xx.
Aquæ Font., ℥j.
Dose, twenty drops for a child from two weeks to a month old; ten drops more to be given in half an hour.

[‡] Carrault, Guide des Méres, p. 78; Paris, 1828.

It is said that women of a brown complexion generally have an abundance of milk, and of an unusually rich quality; and that those of a fair complexion have less substantial nourishment, and that it tends much to keep the bowels relaxed, probably from abounding in a greater proportion of salts.

Females, when giving suck, should use moderate and regular exercise in the open air, and subsist on light, but generous diet, composed of a proper mixture of animal and vegetable substances, regard being had to their usual manner of living. It may, and often is necessary to excite the flow of milk, by the use of additional fluid nourishment, which may sometimes require to be made slightly stimulating. Dr. Struve recommends the drinking of a glass of cold water every morning. He also gives the following prescription, when a little stimulating drink is necessary in women who have been much exhausted by suckling: Two parts of milk should be made to boil over a slow fire, to which is added one part of well-fermented beer, previously boiled. Sugar may also be added, and the beverage should be taken cold.

From the impossibility of obtaining a good nurse for the infant, it will sometimes be necessary to resort to artificial feeding; when such food, the constituents of which bear the greatest resemblance to the maternal milk, must be provided.

Milk of all animals is a white, bland fluid, of greater specific gravity than water, consisting of serosity, curd, or caseous matter, and cream—or, to speak more philosophically, of water holding sugar, soluble salts, and some traces of azotic matter in solution—caseum, and fatty matter; the solid parts being about fourteen per cent.

There are, however, different proportions of these elements in different classes of mamiferous animals; and each kind yields milk, which can be distinguished by its peculiar taste, as well as by the proportion of its constituent parts, on a chemical examination.

The milk of the human female contains more whey, or serosity with soluble salts, than that of the cow, goat, or sheep, and more sugar than that of any other animal. It contains less caseum than the milk of the goat, sheep, cow, and ass; and also less butter than that of the sheep, cow, or goat, but more than the milk of the ass. Human milk is whiter than cow's, and appears to be acid, on the application of the proper tests. Its composition, however, varies remarkably in different individuals. In some, where there is an irregular portion of whey, and but little or no caseum, it yields more or less cream, but never can form butter, even with considerable agitation; in this case, it will not coagulate on the addition of acid. In other cases, substantial cream is formed, and after moderate agitation, yellow butter, of a firm consistence, may be obtained; this milk is coagulable by acids, and a white solid curd separates from it.

The principal constituents of the milk of the five different animals, with that of the human female, which have been submitted to examination, viz., the sheep, goat, cow, ass, and the mare, it appears, generally exhibit very uniform proportions. In the first three, all ruminating animals, the caseous matter and butter predominate, as has been already remarked. The other two, which are herbivorous animals, have their milk very much resembling that of the human female, in the abundance of whey and sugar. Therefore, if it were possible to procure a regular supply of the milk of these animals, it would be decidedly the best substitute we could obtain for the mother's milk; but as this is almost an impossibility, it will be necessary to prepare an artificial substitute from cow's milk, which is always at hand, and so dilute it and combine it, as will make it more closely resemble the natural nourishment of the infant. It should be prepared, by adding at first an equal quantity of rice water, and a little of the purest crystallized sugar. The infant will require no other nourishment than this, which may be altered gradually, so that at the end of the first month to consist of two parts of milk to one of rice water. An infant will scarcely ever require any other nourishment, until about the fifth or sixth month, when thin pap, made by pouring boiling water on stale bread, and combining it with fresh cow's milk, may be given.

While the child is still fed with diluted milk alone, especially in the early part of its life, the use of the sucking bottle is decidedly preferable to feeding with the spoon, as the exertion of sucking evidently promotes the salivary secretion; a very necessary process at all ages. Care should be taken that the vessels be well cleansed by washing them with boiling water, that nothing be allowed to remain which will cause acidity; this should always be done immediately after the child is fed.

Although, as a general rule, the young infant will not require anything more than milk diluted until about the time of the appearance of the first teeth, yet there may be, and often there are, circumstances which demand a more nourishing course of diet; and in case the infant does not appear to thrive, or is affected with diarrhœa, or any other symptom dependant on indigestion, it would be well to vary the food, and gradually accustom it to the use of different and more substantial nourishment. The milk may be thickened with arrow-root, potato-starch, sago, etc., and its effects carefully watched. With all these substances sugar should be plentifully mixed; it is the condiment which best agrees with the digestive organs of infants: indeed, it affords a vast degree of nourishment to all animals, at every age, as is evident, during the season for gathering the cane, when both the negroes, oxen, and mules, show the evidences of its nutritious effects on their systems.

As the infant advances in age, it is evident that an alteration in the consistence of its food is necessary, preparatory to a final discontinuance of nursing; and the substances just mentioned ought to form a prominent article of food about the time of the appearance of the first teeth. It may also be varied, by giving some light animal infusion, either of beef or chicken, with the fat removed. The different articles of food must be used, and that generally adopted which is found the least disposed to become acid.

This is the proper place to speak of the subject of weaning, as one of the means necessary for the treatment of indigestion in infants, where it arises from the impaired quality of the milk, from whatever cause. The age of the milk will also make it necessary to wean the child, even though there should not be decided symptoms of sickness; for it has been remarked by some physicians, that a general debility of the system may arise from the continuance of suckling too long, and also that those children whose nursing is protracted are likely to suffer from hydrocephalus.

The period for weaning the child depends in some measure on the constitution of the mother, and that of the child. The condition of the milk, as has already been observed, may render it necessary even before the appearance of the teeth, or their tardy appearance may render a protracted suckling necessary; but as a general rule, the child ought not to be kept at the breast beyond a year; it may also, in the majority of instances, be weaned about the ninth or tenth month. A French writer, Baillon, recommends that infants be suckled at least for two years and a half; another, Madame Lerebours, goes still farther, and advises suckling to be continued until the fifth year.*

If the child has been gradually accustomed to a change of diet, weaning will not be found to be a process of much difficulty; and if, after weaning, the food still consist principally of milk, thickened with arrow-root, ground rice, etc., there will be little to fear from indigestion. Cow's milk, therefore, should invariably constitute the chief ingredient in the food of children for some months after their removal from the breast, occasionally giving some simple animal broth. More solid nourishment will be needed when the molar and canine teeth have made their appearance; and food of a greater variety, and containing more nourishment, must be given when the digestive organs have acquired an increase of vigor, and are in a condition to allow of its reception.

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* V. Carault, Guide des Méres; Paris, 1828. On this subject the author remarks, "C'est bien donner prise a la plaisanterie, mais l'auteur est d'un caractère trop respectable pour qu'on se le permette."

When a sufficient number of teeth have appeared to enable the child to chew, a moderate quantity of animal food may be used at dinner, with the usual vegetables. The breakfast of children ought generally to consist of milk in some form; and for young children, should be added to a little bread pap. About the fourth year, bread and undiluted milk may be given, and the child's inclination in some degree consulted. For supper, which ought to be taken about an hour before the child is put to bed, the same as is used in the morning.

There is often great anxiety on the part of mothers on the subject of insufficient nourishment, which their children obtain from light diet, so often recommended by physicians. There is, however, little danger of children suffering from this cause; indeed, I never saw an instance. On the contrary, numbers have been brought to the grave by too frequent feeding, and the large quantity of food given. The works of Sydenham, Boerhaave and his commentator, Van Swieten, contain several instances of persons who, from necessity adopted a milk diet, and retained their ordinary vigor. "Sufficient nourishment" was afforded to a rheumatic patient of the first named-writer, by a "little bread and a gallon of whey," taken during the day.* Van Swieten quotes Aretæus' remark, that milk is more suitable to children than any other food; and that if any one will drink milk enough, he will need no other food. The illustrious Boerhaave himself, it is said, for a long time took scarcely any other nourishment than whey.

It is by no means intended, by these remarks, to recommend any one course of food to the exclusion of all others; man is omnivorous, and experience should be the only guide. It is also impossible for the experience of one individual to be the rule by which another is to be directed in his diet. This subject is one on which it is hardly possible to form any theory; for the facts which are familiar to us in relation to it, being liable to be controlled and influenced by a great variety of conditions, everything that may thus influence it should be taken into the consideration in each case that comes under our notice.

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* Epist. to Dr. Brady, p. 328.

DIARRHŒA.

This disease, in some form or other, is extremely frequent among children, both as a functional disorder of the intestinal tube or its appendages, and as a symptom of organic affections. The former class is what we shall at present notice.

Several varieties of diarrhœa are considered by authors; but as some of them are clearly symptoms of indigestion—as that form in which the food is passed unchanged, known by the name of lienteric diarrhœa, and that attendant on weaning—those only, which, from the nature of the evacuated matters, evidently arise from the deranged functions of the intestines, or parts connected with them, and not from gastric indigestion, will be considered as belonging to this class of diseases.

The nature of the evacuations in diarrhœa are very varying, even in individual instances, both at the same period and during the course of the disease; yet the prevailing character which they exhibit, has caused a classification to be made by practical writers—an arrangement well-founded, and of great use as points of general reference, even in the most complicated cases.

There appear to be three varieties of diarrhœa: feculent, serous, and bilious, as the predominating nature of the alvine evacuations indicates. All these may, however, pass into each other, and what at first would appear to possess the distinctive characters of one form, may, by a transfer of irritation, ultimately become of another character; and in all the forms there is more or less mixture of bilious matter, rendering close examination of the alvine discharges necessary to detect the nature of the affection. This inspection of the fecal matter was the subject of much attention in former times; and Hippocrates appears to have been greatly in the habit of close attention to this subject;* and physicians of the present day would do well to imitate this practice of the father of medicine. These varieties are placed in the order of their simplicity; and the first, or the simple form, very naturally first attracts our notice.

FECULENT DIARRHŒA.

This variety consists altogether of the ordinary feculent contents of the bowels, from an increase of their peristaltic motion. It precedes every other form of diarrhœa; for the ordinary contents of the bowels must first be evacuated, before the morbid changes in the secretion occur, which are the distinguishing marks of other forms.

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* Aph. xiv., et seq.

Etiology.—One of the most common causes of this disease is the presence of acrid matters of the food, still imperfectly digested, or from irritating substances introduced into the intestines. In one sense it may be considered as the effect of indigestion, and therefore might be regarded as a symptom of that disease; but the food may in reality be digested, although there may be acid or other irritating matters contained in the mass of the contents of the bowels, from a deficiency in its entire alteration, by which some chemical changes have occurred, rendering them a cause of excitement to the mucous membrane. Cold or wet applied to the surface of the body, constringing the skin, and thus directing the course of the blood to the internal surfaces, already predisposed to excessive action, from their constant natural action in the process of nutrition, will also produce a common diarrhœa in children; but an inflammatory affection is most commonly the result of this cause, and the disease is more likely to become of a mucous form. The retrocession of eruptive affections is also a frequent cause of diarrhœa, and is often a critical change of the disease with which a child is affected. Indeed, any cause which will produce an increase of the ordinary peristaltic motion of the intestines, will be followed by a diarrhœa, consisting of the ordinary fecal matters. Children, to the age of three years, are frequently attacked with simple diarrhœa.

Semeiology.—It is almost always attended with a little nausea and abdominal pain, which disappear immediately on the passage of the feces, to return after a short interval. The evacuations are of the usual fecal appearance, although much more liquid than natural, and therefore it is easily distinguished from other forms of the disease, scarcely containing any of the morbid secretions which characterize them.

Pathology.—In this mild form of the disease there exists merely a morbid degree of irritability or sensibility in the mucous membrane of the intestines, by which the fluid secretions are more abundantly formed and mixed with the contents of the bowels. The mucous membrane can not be considered as in a state of disease; and as this variety itself is never fatal, no opportunity has been afforded to examine the pathological condition of the intestines. Protracted cases of feculent diarrhœa can not exist, without the nature of the affection changing its character, exhibiting either signs of other forms of diarrhœa or of dysentery; and the pathological state arising from the change of the disease, will be indicated by the alteration of the stools—by their color, consistence, and other physical signs. These, together with the results of autopsical investigations, will come under our consideration when the other varieties of diarrhœa are discussed.

TREATMENT.—This disease is often removed by the spontaneous evacuation of the offending matter, on which its existence depends; the morbid action ceasing on the complete discharge of the contents of the bowels. Should the occurrence, however, of diarrhœa be frequent and continued, it will be an evidence that the whole of the irritating substances have not been removed, and the interference of art will be necessary to prevent the occurrence of an inflammatory state of the mucous membrane, by the effectual removal of all the irritating causes of the disease. This should, in every instance, be effected by the most gentle and unirritating means, and such as will neutralize the acid, which in almost every case exists, and which is the principal source of irritation. Calcined magnesia neutralizes the acid of the stomach, without any extrication of gas, and a mild purgative salt is formed by the union; this may be combined with rhubarb, a medicine peculiarly applicable to this disease, from its tonic influence. As a medicine for children affected with simple diarrhœa, rhubarb is of great value, from its astringent effect after evacuating the bowels. To disguise the taste, cinnamon is the best aromatic that can be selected, and may be used where there is no inflammation in the stomach.[*] When there are no evidences of acidity in the primæ viæ, castor oil, or rhubarb either alone, or combined with a small quantity of calomel, in the proportion of ten grains of the former to one of the latter, for a child of a year old, will be the most proper to remove the contents of the intestines. The officinal preparation of the syrup of rhubarb is also an excellent mode of administering that medicine. The common dose of castor oil for an infant, is from half a drachm to two drachms, combined with a little sugar; a tablespoonful may be given to a child three or four years old. If the stomach should be unusually delicate, the medicine may be made into an emulsion, with some aromatic infusion, by the intervention of mucilage, or the yolk of an egg.[†] After these have produced their effects, the irritability of the bowels should be calmed with an anodyne, either the tincture of opium or Dover's powder. The latter preparation, otherwise known by the name of the compound powder of ipecacuanha, is a very mild and safe opiate for children, and may be given in doses of a quarter to half a grain during the first three months, and from one to three grains after a x Dose of Opium

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[*] ℞ Magnes., ʒss.
Tinct. Rhei, ʒj.
Aquæ Cinam., ʒvi.
Syrup. Simpl., ℥j. M.
A teaspoonful every hour, to a child of six months, until the bowels are freely evacuated.

[†] ℞ Ol. Ricini, ℥ss.
Syrup. Rosæ, ℥ss.
Vitel. Ovi, un.
Aquæ Anisi, ℥j.
Dose, two or three teaspoonfuls, to an infant of six months.

year, and from three to six grains at the ages of four to seven. X Tincture of opium may be given in the following doses: half a drop for a child under ten days; a drop for one from that period to the end of the month; a drop and a half or two drops for one from that period to three months; three drops from this time to nine months; four drops from nine months to eighteen; five or six drops from that time to three years; then for every succeeding year a drop or two may be added.* It will seldom be necessary to repeat the laxative medicines after the bowels have been freely moved, for it may then be reasonably supposed that the offending cause has been removed. If, however, the purging should continue, it will be an evidence of a considerably excited state of the mucous membrane; and in addition to the necessary attention to the diet, by the use of mucilages combined with the customary food of the child, and its mixture with an alkali, as mentioned under the article indigestion, it will become the duty of the physician to endeavor to arrest the discharges from the bowels. Indeed, it has been made a question whether any attempt should be made to remove the feculent matters by an aperient, for fear of irritating the mucous membrane. Evanson and Maunsell, also, are of opinion, that when the infant is very young and the evacuations profuse, we should in all cases try to moderate the discharge from the bowels from the first, and only use aperients when the diarrhœa is recent, and occurs directly in connexion with an overloaded state of the bowels.† This practice is doubtless the best, when we are satisfied that this simple diarrhœa depends on other causes than irritation from acid or acrid contents of the bowels. This, however, is rarely the case. Where it does arise from this internal irritation, the experience of the most eminent practitioners, both of former days‡ and of the present, go in support of the views here advanced; and that where there is an irritating cause acting on the mucous membrane, the attempt should first be made to remove it, and thus endeavor to allay the irritation of the mucous membrane. If these fail in effecting this object, opiates and other measures must be used to calm the commotion of the bowels. Before having recourse to direct astringents, it will be the better practice to endeavor still to remove the irritating acid matters, by neutralizing them with some fixed alkali, as potass or soda, which also exerts a direct sedative influence on the gastro-intestinal mucous membrane, thereby equalizing the inordinate peristaltic motion of the bowels.* Super-carbonate of soda is a very useful adjunct to magnesia, where much acidity prevails, and when large doses of the latter would act too powerfully on the bowels. An excellent form, also, for the administration of super-carbonate of soda to children, is that of lozenges, made with sugar and gum arabic, containing one twentieth of their weight of the alkali.

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* Dewees, Op. Cit., p. 363.

† Op. Cit., Amer. edit., p. 154.

‡ The following is Harris's opinion, which was the result of much experience:—"Diarrhœa infantum ab orgasmo humorum in intestina delabentium, vel a turgescentia illic bilis cum acido prœdominium habente semper profluens, nequæ astringentibus proprie dictis, nequæ norcoticis est cohibenda." Harris, Op. Cit., p. 30.

In those cases arising from the application of cold or wet to the surface of the body, the indications are clearly to restore the lost action of the skin, which is generally found harsh and dry. Dover's powder, or small doses of ipecacuanha, are the proper medicines for effecting this object. The subjoined formula will be found peculiarly applicable to such cases,† especially if assisted with warm bathing and fomentations.

If the disease resists the measures already recommended, and there still continues evident acidity of the stomach and bowels, it will then be necessary to have recourse to more powerful measures to arrest the discharges. Chalk, or the friable carbonate of lime, is a powerful antacid, and is a very efficacious medicine in diarrhœa, after the irritating matters have been removed by aperients.‡ A small quantity of opium may be added where the case is obstinate, and the discharges profuse.

Pure argil has of late been much used in diarrhœa, accompanied with acidity, as it forms with the acids an astringent salt. The substance is prepared from the sulphate of ammonia and alumina, by exposing it to a strong, red heat, in a crucible. Argil, in the form of a white powder, remains, possessing great astringent powers. It has been very freely used by the German physicians. Riecke recommends the formulæ which are subjoined.||

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[*] ℞ Sodæ Sup. Carb., gr. x.
Syrupi Aurantii, ʒij.
Tinct. Opii, gtts. vj.
Aquæ, ℥iss.
One drachm every two hours, to an infant of twelve months, until relief be obtained.

[†] ℞ Sodæ. Carb. Excic., gr. vi.
Pulv. Ipecac., gr. j.
" Ipecac. Com., gr. vi.
" Sacchar. Alb., ʒij.
Nitratis potassæ, gr. x. M.
Divid. in pulv. vi.
One every two or three hours.

[‡] ℞ Pulv. Acaciæ, ʒj.
Solve in
Aq. Fœniculi, ℥j.
Adde,
Cretæ, ʒss.
Syrup. Simpl., ℥j.
A teaspoonful every two hours.

[||] ℞ Emuls. Sem. Papav., ℥iijss.
Argillæ Puræ, ℈ij.
Syrup. Althææ, ℥ss. M.
A teaspoonful to a child two years old, affected with diarrhœa.

℞ Argil. Pur., ʒss.
Gum-Arab., ʒj.
Sacch. Alb., ʒij.
Aq. Fœnicul., ℥iij. M.
A teaspoonful to a child a year old.

A strict attention to the diet of the child is of the greatest importance in the treatment of this disease, arising from whatever cause. When the nurse's milk agrees with the infant, no other substitute should be made for it; when otherwise, the directions, under the article indigestion, for the proper substitute, will be applicable to the disease now under consideration. In older children, the diet should be of the simplest and most unirritating kind. At first, no food should be taken; barley or rice water should be all that must be allowed, or perhaps a little thin arrow-root. Often, by such a course, the disease will be arrested in the first twenty-four or thirty-six hours; for, from the entire abstinence, there will be no fecal matters to keep up the irritation. For some days it will be necessary to keep the child on light, thin description of food, such as tapioca, sago, arrow-root, or rice. The latter article, when well-boiled, affords an excellent diet for those predisposed to looseness of the bowels.

SEROUS DIARRHŒA.

This disease has also been described under the name of diarrhœa aquosa, and by Dr. Cullen considered as a variety of mucous diarrhœa. It has also been known by the popular name of watery gripes.

Etiology.—Serous diarrhœa may be the effect of a continued simple flux, the feculent variety not unfrequently terminating in the discharge of serous or watery stools. Any of the causes which produce the first variety may be considered as the cause of this. It is sometimes produced by the application of cold to the surface of the body, and in that case depends on an excited or inflamed state of the mucous membrane of the intestines, a sudden check of perspiration turning the current of the fluids to the bowels. In children who are old enough to use ordinary articles of food and drink, it will sometimes arise from a too free use of cold drinks or acid fruits. For the most part, however, it appears to be connected with an opposite condition of the mucous membrane, which will be considered when we treat of the pathology of the disease.

Semeiology.—The symptoms of the disease may be easily understood from its various names. The discharges consist mostly of serum; sometimes limpid and almost colorless, at other times mixed with mucus, or minute shreds, or colored with bile; but in all its forms it is characterized by copious watery evacuations, which, at the period of teething, are often so abundant and debilitating, that the child is in a few days very much emaciated and exhausted. If, however, the discharges be moderate, the infant may not suffer much, even if it continues for a long time; and in robust children a moderate diarrhœa, during the period of teething, appears to be salutary. It is more serious in proportion as it is complicated with other affections common during teething, such as aphthæ or encephalitis. When such complications exist, children very quickly perish.

MORBID ANATOMY AND PATHOLOGY.—Although the augmented secretion may sometimes depend on an excited condition of the mucous membrane, bordering on inflammatory action, yet in general it can not be regarded as an acute disease, but as one arising from an exalted condition of the exhalents, pouring out their contents from loss of tone. This condition exists in a peculiar manner in teething children; and the muciparous follicles are at that period in a state of activity, which renders their size larger, and their number greater; and they secrete a large quantity of fluid, probably to assist in the elaboration of the food. This explains the frequency of those serous discharges from the bowels in teething children, in whom there exists an increase in the functional activity of the follicles. M. Billard has given several dissections of children, who died from inordinate serous discharges from the bowels during the period of teething, by which the fact above stated is fully proved, a number of well-marked uninflamed follicular plexuses being discovered. It is, therefore, according to this writer, unaccompanied by inflammation; but in some cases a condition of relaxation, or a state of simple exaltation of functional power, and the diarrhœa and consequent marasmus which were observed in the cases cited, were owing to an abundant secretion from the intestinal tube.

TREATMENT.—From the view of the disease here taken, the treatment may easily be deduced. In cases in which it is clearly produced by the application of cold to the external, dermoid surface, the indication is evidently to restore the action to the skin, while the discharges are at the same time controlled, if they are excessive, by some astringent drink; commencing with the mildest. An infusion of the root of Geranium *maculatum*, in milk, in the proportion of half an ounce to a pint, is a good astringent. To an infant of six months, a teaspoonful may be given five or six times a day; a tablespoonful or two to children two or three years old. An infusion, also, of the bark of Rubus *villosus*, common blackberry, may also be used in the same manner. In moderate cases, however, mucilaginous substances should be freely given, as a decoction of linseed, or isinglass boiled in milk. Mucilage of gum acacia will completely cover the nauseous taste of ipecacuanha, which it will be necessary to give, to affect the object above stated, of restoring the action to the skin.[*]

[*] ℞ Pulv. G. Acaciæ, ʒij.
" Ipecac., gr. iss.
Aquæ, ℥j.
Sacchar., q. s.
A teaspoonful every two or three hours, for a child two years old

Ipecacuanha is one of the best diaphoretics which can be administered to children, as it does not excite any inflammation in the alimentary canal; and as it never causes much prostration, may be given to the youngest infant with safety. It may be added to any of the cretaceous preparations, when the dejections are frequent, and the necessity for stopping them appears to exist. Dover's powder, in this form of diarrhœa, is an admirable preparation, often of itself sufficiently controlling the excessive discharges, while its action on the skin tends greatly to restore the equilibrium of the circulation. It may be combined with a small quantity of calomel, if there appears to be a deficiency in the biliary secretion.

If these means do not succeed in arresting the disease, astringents of a more powerful character than those mentioned, when the disease is violent, must be used. Kino and catechu are among the most efficient, and have been much used to arrest inordinate action of the bowels; and where it is so excessive as greatly to reduce the child, these and other astringents may, perhaps, be required. Two to four drachms of the tincture of catechu may be added to any of the cretaceous preparations already mentioned, or argil may be given, as in formulæ at p. 198.

BILIOUS DIARRHŒA.

This form of diarrhœa, in every grade, is not an uncommon disease among children during the summer and autumnal months. It affects them at all ages, from the infant of a few days to the child at every period. Infants, however, are much more liable to this affection than children at a more advanced age, from the great susceptibility of the system to external impressions. The heat of the atmosphere being its principal cause, such a result might very naturally be expected.

Etiology.—Diarrhœa, consisting chiefly of bile, is caused by an inordinate secretion of that fluid, possessing, without doubt, an unusual degree of acridness, by which the peristaltic motion is excessively increased. The most common remote cause is high atmospheric temperature acting on the liver, and greatly exciting its secretory functions. That a heated atmosphere will produce such effects in the autumnal months of temperate climates, and to a much greater extent in the intertropical regions, is a fact that has been noticed by all authors. The effect of this agent in the production of hepatic affections, was long since remarked by Celsus.* It has also been observed by numerous authors of modern days, who have resided in hot climates; Johnson, Mosely, Beddoes, Lind, and others. Indeed, the prevalence of this affection during the hot months, and in hot climates, and its almost entire absence in colder seasons and in higher latitudes, scarcely allow of a doubt, that it is to the influence of atmospheric heat that these hepatic affections are principally to be attributed.

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* Omnis calor et jecur et lienum inflamat. Lib. ij., c. i.

It is difficult to explain, in a satisfactory manner, how heat operates in exciting the hepatic secretion. It is, however, probable, that it is by its directly stimulating effect on the circulation—the part most freely supplied with blood being the part first to feel the effects of this agent, from the expansion of its fluids. The liver is more liberally supplied with blood than any other organ, as it possesses two sets of blood-vessels for nutrition and secretion, and on this account would the soonest feel the effects of heat.

It not unfrequently happens that bilious diarrhœa will be produced by improper food, and especially by bad milk of the nurse. Constant acidity attends it under these circumstances; and its immediate cause would appear to be an irritation, and perhaps inflammatory action in the duodenum, transmitted to the liver by continuous sympathy.

Semeiology.—The evacuations are at first feculent, and afterward present the appearance of pure, healthy bile. Often, however, they are variously colored, from a bright yellow to a deep green. The urine is often colored of a deep yellow, and the eyes and skin are sometimes tinged with the same hue.

An acid odor is frequently perceptible in the breath of a child affected with this disease; the evacuations are then green, and from the actions of the child, and the relief usually experienced by pressing on the abdomen, he appears to be affected with colic pain. Although there may be but little bile in the evacuations, yet, if much acid be present, they are always green; all acids decomposing bile, and producing a green precipitate. This effect of acids on the bile has been denied by some, but the question is put at rest by direct experiment. The following is one which I made, to ascertain the truth of the generally received opinions on this subject.

I procured a small quantity of human bile; it was of a brownish yellow, and of a viscid consistence, like thick gelatinous mucus. A portion of this was largely diluted with pure water, until it exhibited the yellow appearance of ordinary bile. To this was added a drop of muriatic acid; the whole became immediately of a turbid green. The colored part afterward was precipitated, leaving the fluid transparent and colorless. The same experiment was tried with sulphuric acid, with a similar result; the color, however, was not so well marked as that produced by muriatic acid. Acetic acid coagulated the bile, and produced a turbid yellow, inclining to green. Similar results followed an admixture of the inspissated bile with these acids. In the latter, which was exposed to the action of the atmosphere, in proportion to the decomposition which ensued, a change occurred in the color, which passed to a blue, and afterward red. In the others, which remained tightly corked in small vials, no alteration appeared for several weeks.

Morbid Anatomy and Pathology.—The mucous membrane of the intestines is excited to secrete an increased quantity of its fluids by the irritating quality of the bile; hence the copious and frequent discharges from the bowels. Whenever there is an inordinate secretion, the fluids secreted appear to be changed in their qualities. This is peculiarly the case with the bile, which in some instances is so acrid, as to excoriate the skin which it touches in those engaged in dissection. The pungency of the bile, also, has been found so great, as to cause pustules on the tongue and lips. It is not surprising, therefore, that violent diarrhœa should follow the inordinate secretion of this fluid, when in a natural state it excites a discharge of intestinal fluids, as is proved by the great dryness of the feces when but little bile is secreted. When long continued, the mucous membrane suffers from inflammatory action; and in these protracted cases, ulceration is found in the intestines, and a sanguineous engorgement of the liver.

Treatment.—The first indication in this disease is to remove the acrid and irritating matters which are evidently its immediate cause, by the administration of some mild purgative, as castor oil. When the bowels have been thus freely evacuated, the next indication is to allay the excessive irritability of the intestinal tube, by a few drops of laudanum or Dover's powder. After the pain and irritability have been allayed, it will then become necessary to endeavor to control the functional disorder of the liver, by the use of small doses of calomel, which appears, especially when combined with ipecacuanha, to exercise a very salutary influence over the hepatic system.[*]

Calomel, given, in this form, is preferable to active purging doses, which are very apt to cause inflammatory irritation in the mucous membrane. Calomel may also be very advantageously combined with Dover's powder, whenever it is deemed advisable to allay the disturbance of the intestinal canal with an anodyne. The use of anodynes, however, must be considered only of temporary necessity at this time, and should be avoided, if possible, as long as the stools exhibit a large quantity of bilious matter; and absorbents and astringents, so beneficial in serous diarrhœa, it is very evident are not applicable to the form of diarrhœa now under considera-

[*] ℞ Hyd. Subm., gr. ij.
Pulv. Ipecac., gr. j.
Sacch. Alb., q. s. M.
Divid. in Pulv., No. vi.
One every two hours, for a child three years old.

tion, under any circumstances. The plan of evacuating the bowels, by the daily administration of mild purgatives, should be persevered in, until the discharges assume a natural appearance.

Fever not unfrequently attends bilious diarrhœa. When this is the case, small doses of antimony, in the form of James's powder, may be combined with calomel, in the dose of one to five grains, or tartarized antimony, combined with acetate of ammonia.[*] As antimony in every form is sometimes exceedingly prostrating to some children, ipecacuanha may be substituted, when there is much fever, in the form already recommended. When, however, there is great inflammatory irritation in the mucous membrane of the bowels, which may be known by pressing on the abdomen with the hand, and by the great heat of the integuments of the abdomen, both antimonials and purgatives ought to be avoided; at least the latter should be of the mildest kind, and mucilages ought freely to be used. Fomentations ought, under these circumstances, to be applied to the bowels, by means of a flannel, wrung out in warm water. The warm bath, also, will be peculiarly applicable when there exists any inflammation.

During the whole of the disease the strictest attention should be paid to diet, and no food allowed but the mildest and most unirritating; arrow-root, tapioca, sago, barley, or rice, well boiled, are the most suitable kinds of food. Rice, especially, from the good effects in diarrhœa following its use, has been supposed to contain some astringent qualities; but nothing of this kind has been discovered on subjecting it to analysis; it is, therefore, probably owing to its bland qualities sheathing and protecting the mucous membrane from the effects of the irritation of the acrid contents of the bowels. In very young children these vegetable substances are often found to disagree with the digestion and become acid; when this is found to be the case isinglass made into a jelly forms an admirable substitute; being destitute of any irritating quality, and almost wholly digested.

MIXED AND CHRONIC DIARRHŒA.

The preceding forms of diarrhœa present the strongly marked differences in the disease. It is not to be expected, however, that the symptoms which characterize all these varieties, are in every instance to be so clearly defined, as to bear the peculiar mark of one form unmingled with the others. Even in the most distinctly marked, all that we can expect to find, is a predominance of one symptom, imparting to the disease, a distinctive form, sufficiently clear to enable the careful practitioner to direct his treatment according to the pathological condition which the symptoms indicate. Diarrhœa often assumes different appearances at different stages; and even at short intervals the evacuations will very materially alter their character, and exhibit unexpected changes, of a nature very different from those that immediately preceded them. Indeed, in infants where the system is peculiarly liable to every impression, such a blending of symptoms might very naturally be looked for, especially when the different causes of the varieties of the affection we are now considering are borne in mind. These causes, almost in every instance, co-exist in infants; in older children, less frequently. Diarrhœa, for the most part, affects infants during the summer season; and if to the influence of heat on the liver, causing an increased secretion of bile, be added the changes occurring in the muciparous follicles during the period of the appearance of the teeth, we shall have two causes in operation to induce diarrhœa; and the diarrhœa, possessing the characteristics of bilious and serous combined, will ensue. If to these be added the effects of irritating, ascessant, or undigested food, there will be superadded the usual symptoms of indigestion—flatulency, colic, feculent diarrhœa, or the evacuation of crude, unaltered aliment. How important, then, is it to keep in mind, that all these various forms are to be expected, particularly if the disease be to any degree protracted; and by a careful examination of the usual signs of the internal affection, be prepared to meet the change of symptoms, and to adapt the remedies, properly modified, to the existing diseased condition of the child. It will sometimes be necessary, in addition to the direct treatment, to allay febrile excitement by the ordinary means, or to remove an occasional cause of the excitement by scarifying the gums, where a tooth is its source; to meet the evidences of inflammation of the mucous membrane, which may arise in the course of the disease, in any of its forms, or to arrest the tendency to cerebral congestion, to which young children, during the growth of the brain, are peculiarly liable: and, in short, to treat the disease on the only rational principle, of endeavoring to ascertain the actual diseased condition of the patient. Sometimes, where the disease is kept up by a morbid irritability, it will be necessary to allay it by opiates, or to arrest it by astringents or tonics, when it depends on continued debility and a relaxed state of the mucous membrane, whatever be the most prominent appearance of the evacuations. These varying conditions can only be ascertained by close attention, and by a constant application of the general principles of pathology to the case under consideration. When the disease has continued, it becomes chronic in its character, and is the form for which the physician is most frequently called on to prescribe. It is in its protracted state that it most often assumes all the various forms of the disease, the nature of the evacuations differing in each individual case, according to the constitutional vigor, and the different exciting causes which may be in operation; and often changing in the same individual, so as in a short time to present all shades of the different varieties of the disease; and in some severe cases exhibiting the symptoms of dysentery, a quantity of mucus, sometimes streaked with blood, constituting the nature of the alvine discharges. But without further remark, we will proceed to consider chronic diarrhœa, which may in reality be deemed a fourth form of the disease; as it depends for its cause on the irritation of the mucous membrane, different from the others, under the systematic arrangement adopted in this work.

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[*] ℞ Liq. Ammon. Acet., ℥ss.
Vini. Antimonii, ʒss.
Aquæ Destil., ℥iij.
Syrupi Simpl., ℥ss. M.
A teaspoonful every two hours, to a child eight months old.

Etiology.—From what has been already said in relation to the acute form of diarrhœal affections, it will be easily perceived that a continuance of the causes of the irritation of the mucous membrane of the intestines, will ultimately excite in that delicate and sensible tissue a morbid irritability, by which the affection is kept up, not so much from the constant application of the original exciting cause, as from the existence of a newly developed action, either of extreme irritability, or of sub-acute inflammation. Although there is often doubtless a continued application of the original cause of the disease, such as pungent bile, ascessant food, irritation of feces, yet, when the disorder has been protracted, its existence depends more on the newly developed condition of the mucous membrane, than on the stimulating contents of the bowels. Its cause must, therefore, be looked for in the long continuance of the other forms of diarrhœa, especially if they have been either badly treated, or altogether neglected.

Semeiology.—The original form of the disease gradually changes its character, and the predominant symptom yields to a new appearance in the evacuations. From being principally bile or serum, they now become curdy, flaky, mucous, or, perhaps, in severe and long-continued cases, purulent. The feculent discharges show the evidence of indigestion, and are often mixed up with frothy matter, resembling yest in color and consistence. As might be expected, where indigestion bears its part in the aggravation of the disease, colic pains are very frequent and distressing. From the same cause, also, the appetite is variable; sometimes entirely gone, at other times craving. The thirst is very intense, cold water being eagerly drank by children, at all ages. The skin is hot and dry, and the pulse frequent and small. This heat, as the disease advances, is remarkably great on the abdomen; and, while the surface of the body generally may at times, and at the close of the disease, be comparatively cool, the abdominal integuments will be intensely hot. This latter symptom is a very unfavorable one, a preternatural heat over any part being a sure indication of disease beneath it; and, in the one now under consideration, shows the progress and violence of the inflammation. This condition of the surface of the body did not escape the notice of Hippocrates;* and it was a practice with some of the older physicians, to detect the existence of internal inflammation by the application of wetted cloths, and the part on which they soonest dried covered the spot in which inflammation existed. The abdomen is generally very tender on pressure; the face becomes pale, and the child much emaciated; and, as the disease advances to its termination, œdematous tumefaction appears both in the face and limbs, while the discharges from the bowels usually give evidence of the disorganization of the mucous membrane, by the presence of purulent matter.

Protracted diarrhœa affects the system, both by the debilitating effects of the increasing peristaltic motion, as well as by the prostration occasioned by the great secretion from the appendages to the intestines, and from the intestinal mucous surface. The total diminution of the powers of digestion, also adds to the prostrating effects of the other causes. The whole system also sympathizes greatly with any irritation or inflammation of the intestinal tube, and a general prostration ensues; which, together with the effusion above mentioned, and especially the great tendency to cerebral effusions, render chronic diarrhœa in children a most serious and fatal disease.

MORBID ANATOMY AND PATHOLOGY.—Autopsical examinations clearly reveal the causes of the symptoms above stated, and show, with what accuracy, by sufficient attention to the signs of the disease, the pathological condition may be ascertained during life; for on inspecting the bowels, they are found in a greater or less state of inflammation. Yet there does not exist a disease where the fallacy of an entire dependance on the autopsical examinations, as an evidence of the actual state of disease, and consequently as our only guide in the treatment in all its stages, is more apparent. Diarrhœa, in its first stage, can scarcely be anything more than an excessive irritation of the tender mucous surface of the intestines. As it advances, all the symptoms show that this state of irritability has become a permanent affection; the next step, that it has passed to an inflammatory action; still going onward to its fatal termination, the symptoms manifest a disorganization and destruction of tissue, which, it will be presently seen, is what is found, on a post-mortem investigation, to be the actual state of the affected part,—the remains or consequences of a condition previously existing, but materially different in its nature from the original affection. Without, therefore, regarding the anatomy of the part as giving us the exact state during life, it is still highly valuable in enabling us to form a judgment of the progress of the affection, and thus directing us in the application of such remedies as the chain of symptoms during life, with the corroboration revealed by fatal cases, suggests.

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* Et ubi in corpore calidatus aut frigiditas, isthic morbus est. *Hippoc.* Aph. 39 sect. 4.

This inflammation is found to exist more particularly in the large intestines; but the small intestines not unfrequently participate in it, especially where life has been long protracted, and the colon exhibits evidences of disorganization. Ulceration is frequently met with to a considerable extent, the ulcers having elevated margins, surrounded with livid-colored patches. Sometimes, in the place of ulcers, there are found a number of tubercles, forming small elevations on the mucous membrane.* It is not unusual, also, to find fungoid elevations on different parts of the mucous surface of the intestines; these, together with the thickening of the mucous membrane, very materially diminish the calibre of the intestines.

It is stated by Burns,† that fatal diarrhœa not unfrequently reveals extensive introsusceptions, not less than fifty having occurred in the course of the dissections by his brother. They occur, in all probability, from the violence of the peristaltic motions, and the coexistence of sudden spasm of the bowels. When this is the case, there is not much inflammation present. Indeed, this effect is most likely to occur before the continuance of the disease has developed the morbid irritability and inflammation, which characterize the affection when protracted. The existence of introsusception, it is agreed by all, is very obscure during life, but it may be suspected when the disease terminates suddenly and unexpectedly.

A diseased and congested state of the liver not unfrequently accompanies the disease; a condition which, during life, may be known by the right hypochondrium being fuller than usual, and when the diarrhœa is accompanied with cough.

TREATMENT.—In the treatment of chronic diarrhœa, regard must be had to the general principles on which the disease in its acute form is to be treated, of course modified according to the necessity of each case. A close attention to the symptoms will be particularly necessary, in the form of disease which partakes of the mixed character of the other forms, while to them is superadded a newly developed irritability of the mucous membrane. Attention must, therefore, in the first place, be directed to the allaying of the morbid excitability of this membrane, as well as to the removal of the continued irritation from acrid secretion, rather than to attempt to arrest at once the alvine evacuations, while the food is properly regulated as to quality and quantity.

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* Eberle, Op. Cit., p. 244.

† Principles and Practice of Midwifery, including the Diseases of Women and Children, Amer. edit., p. 734.

When the physician is first called to prescribe for diarrhœa in its chronic state, it may require the administration of a purgative, to remove the still irritating feculent matter which may not, in the first period of the disorder, have been attended to, or which may have accumulated from improper food. Of the necessity of this course, the physician must judge by the history of the case, and the degree of tension and fulness of the bowels. Castor oil will be the safest to fulfil this indication, while the addition of a few drops of laudanum will tend to allay the excessive irritability of the mucous surface of the bowels, and to prevent the griping effects of the purgative, and thus fulfil another important indication. If fecal matter or scybala appear in the evacuations, it will become necessary to repeat the purgative, guarded in the same manner.

While these means are used to allay the morbid irritability of the part immediately affected, or to remove the irritating cause by evacuating the bowels, it will be necessary to correct the biliary secretion, and relieve the congested state of the liver; the one, for the purpose of procuring a discharge of healthy bile, and the other, to relieve the accumulation of blood in the extreme branches of the portal vein, by which the disease is kept up from the partial stoppage of the hepatic circulation. For this purpose, calomel, combined with opium,[*] or, what may perhaps be less irritating, a grain or two of blue pill; or when the discharges are excessive, and apparently accompanied with acidity, the hydrargyrum cum cretâ.[†] Care should be taken that the latter preparation do not too suddenly check the diarrhœa; this must be prevented by a little castor oil, combined as before directed. With this precaution, other astringent or cretaceous preparations may be used, after the mercurials have had their proper effects on the secretions; the tranquillizing plan being kept prominently in view. Frictions, with the ordinary hartshorn liniment on the surface of the abdomen, or a camphor plaster, will be found highly useful means in the treatment of obstinate diarrhœa, when there is not much heat on the surface of the abdomen.

When evidences of inflammatory action appear to exist in the mucous membrane of the intestines, the treatment should then be directed to lessen the inflammation, and an antiphlogistic course adopted, modified according to the violence of the disease and the strength of the patient. Leeches ought, under these circumstances, to be applied over the epigastrium, and the bleeding from the bites encouraged by the application of a large warm poultice of Indian meal. A poultice of this kind is preferable where a continued warmth is desired, and where the patient ought not to be disturbed by a repeated change of the applications. It retains heat much longer than any other kind of poultice. A little moistened shorts make a good, light poultice, where there is much pain in the bowels. During the progress of the disease, the great tendency to cerebral congestion and effusion in children affected with diarrhœa should be kept in mind, and all the means in our power used to prevent an occurrence almost necessarily fatal. The bleeding just recommended, while it is the most efficacious means for combating the inflammation, will also tend to prevent the cerebral affections. Revulsives to the lower extremities, by means of a stimulating bath, will also be a necessary adjunct to other measures adopted to prevent a determination to the brain. For the purpose, also, of removing an additional source of irritation, by which a febrile action is excited, and the hazard of local congestion increased, the gums should be freely divided when the teeth appear to be pressing on the gums.

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[*] ℞ Hydr. Subm., gr. iij.
Pulv. Opii., gr. ¼. M.
Divid. in Pulv., No. vi.
One of which to be given three or four times a day, to a child of one year.

[†] ℞ Hydr. C. Cretâ, ʒj.
Pulv. Ipecac. Comp., ℈ij.
Magn. Carb., ʒss. M.
Four to six grains, to an infant of six months.

The disease will often continue without any very decided symptoms of inflammatory action, at least to such a degree as to appear to require direct antiphlogistic remedies; a sub-acute inflammation, or an inflammatory irritation existing, keeping up the morbid symptoms, and wasting the strength of the child by the constant discharge from the bowels. Under these circumstances it will be necessary to resort to astringents, cautiously used, or to some of the active stimulants possessing astringent powers, which, in the experience of some of the ablest and most observing physicians, appear to exert a peculiar influence on the mucous membrane. In protracted and obstinate cases, Dr. Baillie used nitric acid, which, it is said, for I have no experience in its use, possesses a remarkable power of allaying the morbid action of the mucous membrane; this he gave in conjunction with simarouba and opium. This combination of powerful astringents and an anodyne, would appear only applicable in cases of very prostrating continuance of the disease, and probably in its ulcerative stage.* The same remark applies, also, to the sulphate of iron, which has also been used in cases of excessive atony and relaxation from profuse discharges. It is given in the dose of half a grain three or four times a day, to a child three or four years of age; or from half a grain to one grain to those from four to six years. Nitrate of silver, also, has been used for the same purpose, and strongly recommended by Dr. Eberle,[*] who remarks, that although it is a powerfully irritating substance, yet it acts frequently on inflamed surfaces with a peculiarly soothing and alterative influence, changing the irritability of the inflamed mucous membrane of the bowels. Balsam of copaiba, also, is a highly useful remedy under the circumstances now considered; it may be given as in the subjoined formula.[†] In those cases of diarrhœa depending on the irritation of worms, the suitable remedies will be detailed when that subject comes under consideration.

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* ℞ Infus. Simaroubæ, ℥jss.
Acidi Nitrici, gtt. iv.—vi.
Syrupi Caryophyl., ʒiv.
Tinct. Opii. gtt. vi. M.
One or two teaspoonfuls of the mixture to be given in barley water.

During the whole of the disease, the strictest attention to diet will be necessary, and that consisting principally of mucilaginous substances adopted, to the entire exclusion of every other. This alone will often effect a wonderful change in the disease. Well-boiled rice, tapioca, sago, for food, and infusion of slippery elm, or diluted gum syrup, for drink, are among the most powerful remedies for controlling the morbid action of the mucous membrane, as they leave in their digestion but little feces to act as an irritant. Where these disagree, isinglass made into jelly will be the most appropriate article of diet.

CHOLERA INFANTUM.

Among all the diseases of our infant population, there is none more extensive in its ravages than the diseases of the bowels, arising in young children, during the months of July, August, and September. In every section of our country, the young, during the period of teething, suffer from these affections; and the most fatal of these is the cholera of infants. This affection prevails more in the southern and western states.

It has been said by some of our writers to be peculiar to the United States. This, however, appears to be an error, for Cleghorn, in his account of the diseases of Minorca, describes a disease, bearing symptoms in every respect corresponding to those of this disease.

Wherever, therefore, there is great atmospheric heat, combined with malaria, and especially with that engendered by large collections of inhabitants, as in cities, there the disease is found. It is on this account extensively prevalent in our country; but is not dependant on heat alone, as it is observed that in some of our most southern sections of country it is not so rife as in New York or Philadelphia. The open country is remarkably exempted from this scourge.

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[*] Op. Cit., p. 252.

[†] ℞ Bals. Copaibæ, ʒss.
Tinct. Opii, gt. vi.
Mucilag. g. Acaciæ, ℥j.
A teaspoonful three times a day.

It prevails mostly in cities, and is in some places a remarkably fatal disease. In Philadelphia it is much more fatal than in New York or Boston; and in the latter city it has been doubted by some whether the disease exists in its genuine form.

The great mortality of cholera infantum, and the extreme range of the disease, make it one of the most interesting to the physicians in this country. It has accordingly from time to time received the attention of physicians, as appears from the number of essays which have been published. Among these is the excellent practical one of Dr. Rush, first published in 1789; that of the late Dr. Millar, of New York, in the year 1800; and the Boylstonian prize essay of Dr. James Mann, on the cure of the autumnal diseases of infancy, as prevailing in New England, published in 1805. Dr. Jackson has also recorded some excellent observations on the disease, in the first volume of the New England Journal of Medicine and Surgery. Drs. Dewees and Eberle, also, have given some valuable remarks, the result of much experience in the disease, in their respective treatises on the diseases of children. Dr. Horner's essay, published in the third volume of the American Journal of the Medical Sciences, is the only complete and satisfactory account we possess of the morbid condition of the parts immediately connected with the most prominent symptoms, and is a valuable addition to our stock of knowledge, by which some approach may be made to the formation of a correct theory of the disease. Other essays will be referred to in the course of these remarks.

Etiology.—The consideration of the causes of cholera infantum is probably of more importance in its management than perhaps that of any other disease of infancy. The constant recurrence of the disease in every warm season, in almost every part of our country, has rendered us familiar with the symptoms, and, although the contrary would appear to be the fact from the great and uncontrollable mortality, also with the most efficient mode of treatment. It is, therefore, to the predisposing and the constant operation of the exciting causes, that we must chiefly look for the continued fatal progress of the disease.

The consideration, therefore, of its causes, becomes of the greatest importance in its treatment; and in vain will the remedies be applied for its removal, while the causes of its existence are still in active operation, and more active in proportion to the loss of vigor, and the increased inability of the child to resist them.

The two principal predisposing causes are teething and improper food. The action of teething, or rather the condition of the system connected with the development of the teeth, is one of increased excitement, from the universal sympathy of the different parts of the body with the irritation existing in the gums. The eruption of the teeth is also connected with very important changes throughout the mucous surface of the digestive tube. It is a remarkable fact, and one which has been noticed by all writers on the disease, that the time of teething is a period at which cholera infantum appears, and that this condition of the system is essential, in union with other causes, to its formation; the exceptions which occur go rather to the establishment of the fact, as they are in close connexion with the changes in the digestive tube, on which the development of the disease depends.

Another predisposing cause is error in diet. It is unnecessary here to enlarge on the subject of inappropriate food for young children as a cause of disease. It is sufficient to refer to it as an unnatural stimulant, which, by its irritation, either excites the organs of assimilation to a preternatural and excessive action—a state which it will hereafter be seen is essentially connected with the disease in question—or it maintains them in the condition of excitement after the usual period of these changes, which occur at the time of the eruption of the first teeth.

Long-continued heat is the ordinary cause of cholera infantum; and it invariably makes its appearance after the hot weather of our summer season has commenced, and prevails generally in proportion to the degree of heat; consequently it is no uncommon thing to find some seasons almost exempt from this scourge, when the range of the thermometer is comparatively low. As it appears with the hot weather, so does it disappear on the arrival of the cold, at the commencement of autumn. This is so invariably the case, that heat must be regarded as its principal cause. Although heat is one of the chief agents in the formation of the disease, yet, from its almost entire absence in the open country, where the range of thermometer is often as high as in cities, it is evident that other causes must exist, in connexion with heat, to produce the disease. This is found in the malaria, principally of cities. In the densely-populated parts of our cities, amid the impurities engendered by poverty, the disease prevails during the heat of our tropical summers with great mortality. In the thickly-populated portions of large towns and cities, it appears principally to spend its force; while in other parts it is comparatively rare. A close, dense, impure, and heated atmosphere, connected with the predisposition produced by teething, are therefore the causes of cholera infantum. All these conditions appear to be necessary to its development, as no one of them alone has been found sufficient to produce the disease. It is not found in teething children in the salubrious air of the country; nor does it prevail at any other time than during the period of dentition; and among these only at particular seasons of the year. It is stated that it occurs before the period of teething; but when this is the case, there exist other causes, having a connexion with the pathology of the disease, and developing the same condition of the system which is present during the active state of dentition.

SEMEIOLOGY.—Cholera infantum is very variable in its approach; scarcely any other symptom, however, exists at first than diarrhœa, often continuing for several days without any nausea or fever. Although, for the most part, this is the first symptom on the invasion of the disease, yet it not unfrequently happens that vomiting accompanies the purging from the commencement of the disease. When the latter symptom exists at first, in connexion with the diarrhœa, the disease is proportionally severe; for under an attack so violent, the disease usually terminates fatally in a few days. For the most part, however, the diarrhœa will commence with the discharge of ordinary fecal matter, which very soon, however, changes to a thin serous-looking fluid, variously colored. When the disease is fully formed, the ordinary feces are retained, and the evacuations are mostly of this watery fluid, colored brown, white, sometimes yellow and green. They are, at times, very offensive, and again without any other odor than what arises from acidity. In the greatest number of instances they are offensive, but not of the peculiar character which distinguishes fecal matter; it appears to be of the nature which characterizes the ordinary decomposition of animal matters. According to the location of the disease in different parts of the intestinal tube, the evacuations present a difference in their consistency and appearance; thus, when the lower portion of the intestines is affected, the disease bears a resemblance to dysentery, and the evacuations are slimy, gelatinous, and bloody; while tenesmus and pain, on evacuating the contents of the bowels, are very severe. In the most severe cases, the evacuations show the extent of the disease throughout the entire intestinal tract; and it is in such cases that they present a great difference in their appearance, including all the above varieties, and at times mixed with a frothy matter resembling yest, and with imperfectly digested food, or that which has passed almost unaltered.

The diarrhœa, after it has continued for a few days, is followed by an obstinate vomiting, or attempts to vomit; one of the most distressing and uncontrollable symptoms of the disease; preventing the administration of medicine, and even the swallowing of drinks, which are eagerly demanded by the little patient.

Fever, of a very irregular character, occurs at an indefinite period of the disease, and is remarkable for its irregularity. A very unequal heat exists in different parts of the body. The skin is cold and pale, with the exception of that part covering the abdomen, which, together with the head, is excessively hot, showing a great determination of blood to these parts. From the actions of the child, he appears to suffer from severe pain in the head. Pain, to a greater or less extent, is experienced on pressing the abdomen. This pain and heat increase with the progress of the disease.

The pulse is small and wiry, and its frequency denotes a great degree of irritability, and is by no means indicative of much general disturbance. The local affections above mentioned are the most marked derangements which exist in the circulatory system. That of the brain is a very prominent one; and in addition to the heat and turgescence of the head, the eyes exhibit this state by their suffused and bloody condition. At times they appear as if really inflamed; when this is observed, there is great restlessness with delirium. On the other hand, there may exist great stupor and insensibility to every impression, when the eyes are dull and inexpressive; the child sleeps much, with the eyes partially closed.

The tongue is for the most part dry, a little furred, of a bright ash color; or it may be without fur, but red and dry. This latter state occurs more especially as the disease advances, and the stomach becomes the seat of the greatest part of the disease.

The skin, which at first is generally pale and clammy, becomes, as the disease advances, dry and ash colored. It hangs loose, and in folds about the body, while over the forehead it is drawn tight. The cheeks become shrunken, and as the disease advances to a close, the bony prominences of the face, and the shrivelled aspect of the cheeks and lips, give to the infant the expression and appearance of an old person. The muscles, in every part of the body and limbs, are shrunk and flabby.

The emaciation is very rapid in this disease, there being no digestion of food, while a discharge of the fluids is taking place with scarcely any intermission.

Dr. Dewees mentions the existence of a number of minute vesicles, of a crystalline appearance, on the chest, and considers it a very unfavorable symptom. I have never been able to discover it; and indeed, he observes, that it may readily escape observation.*

The disease is usually protracted to two or three weeks, and sometimes, even to some months; its average duration is about three weeks.

The prognosis of cholera infantum is a subject of great uncertainty, from its liability to sudden changes, even after the establishment of favorable symptoms. When, therefore, the disease proceeds onward without any mitigation of symptoms, its fatal termination may be expected with scarcely any doubt.

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* Op. Cit., p. 398.

The first appearances in the amendment of the child, are in the abatement of the febrile symptoms, and the ability to retain drinks or medicines. The stools, also, change to a more natural hue, while the odor is more like that of the natural feces. The presence of bile in the discharges is almost always a certain evidence of recovery, as its absence is an unequivocal sign of a fatal progress of the disease. While these symptoms appear, the pulse at the same time is slower and more full, the heat leaves the head and abdomen, and becomes more diffused over the surface of the body.

MORBID ANATOMY AND PATHOLOGY.—Dissections of those that have died of cholera infantum, show that the abnormal alterations are principally confined to the abdominal viscera. The brain, especially, in some protracted cases, is in a state of congestion, with serum effused in the ventricles; a condition usually occurring in all protracted cases of disease in children, and therefore is not to be regarded as peculiar to this. The thoracic viscera are always in a healthy condition.

It is a remarkable fact, that all who have recorded dissections of those who have died of cholera infantum, speak especially of the liver, as being greatly enlarged, and in a state of complete sanguineous engorgement; and not only enlarged, but of a firmer texture than natural. According to the various statements recorded, it has been found so large as to occupy two fifths,* one half,† and even two thirds, of the abdominal cavity.‡ The intestines, also, exhibit the effects of inflammation in every portion of their track; but especially in the mucous coat of the duodenum, jejunum, and ileon. Dr. Horner has satisfactorily proved that the morbid alteration exists particularly in the mucous follicles of all the intestines; and so marked were the cases dissected by him, of follicular inflammation, that he compared the appearance to the vesicular diseases of the skin. This, therefore, with the enlarged state of the liver, constitutes the essential characteristics of the morbid anatomy of cholera infantum.

It is a remarkable fact in the history of this disease, that three circumstances are necessary to its production. The state of the system occurring during dentition, a high atmospheric temperature, and an impure state of the air: no one of these alone is in general sufficient to form it; nor do any two of them appear to be the agents of its formation. It never appears in the pure air of the country; nor does it prevail in cities at any other season than the summer; nor does it attack children, except during the period of dentition; scarcely ever occurring after the teeth have all appeared. To this last rule there have been a few exceptions; and the disease is then always attributable to some error in diet, by which the development of the follicular apparatus takes place prematurely, placing the child in the same pathological condition as that which occurs during the time of dentition, from a natural, though at times an excessive development of the mucous follicles of the intestines; a state which we have already seen to be the morbid condition of the bowels in this disease.

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* Dewees, Op., Cit., p. 400. Jackson, in N. E. Journ. of Med., vol. i., p. 24.

† Remarks on Cholera Infantum, by Harvey Lindsley, M. D., Amer. Journal of Med. Scien., vol. xxiv., p. 305.

‡ Horner's Path. Anat., p. 171.

It is a very striking coincidence, that M. Billard, in his valuable essay on the pathology of infants, has shown that the follicular apparatus of the intestines is in a state of active development, simultaneously with the appearance of the teeth; and that every part of the digestive system undergoes at this period a change in its functional action. In connexion with this state of the part, the congested state of the liver, produced by the heat of the weather, particularly when aided by an impure state of the air, becomes the principal source of the disease, by preventing the return of blood from the intestines through its ordinary channel. The mucous follicles, already predisposed to disease by their natural development above mentioned, are excited to morbid action, by being thus crowded with an undue amount of fluids.*

TREATMENT.—From the view here taken of the disease, it is evident that our chief efforts should be directed, in the first place, to the removal, if possible, of those exciting causes on which the disease depends for its continued existence. It has been ascertained that heat and a vitiated atmosphere are the chief exciting causes; and it will be but of little avail if the therapeutic measures are used, while the child is continually exposed to the ordinary agents producing the disease. This is seen in other diseases; and convulsions have prevailed in hospitals, which resisted the treatment usually pursued in such cases, until the impurity of the air breathed by the children began to be suspected as the principal cause; when this was remedied, the convulsions, before so fatal, became comparatively a rare and mild disease.

It will therefore be necessary, in every instance, to be scrupulously particular in the direction of everything that can correct the extreme heat and purify the air. Among some exposed to the sufferings and privations of poverty, this may be a difficult, if not an almost impossible undertaking. Something, however, may be attempted by daily exposing the child to the reviving influences of the fresh air, by a walk in the cool of the day in the vicinity of the water; by frequent ablutions with cool water when the weather is excessively hot, and by the adaptation of the clothing to the existing temperature. These are important measures, both in the prevention and cure of cholera infantum; but more especially are they applicable to all children in the heat of summer, whereby this formidable disease may be prevented. The causes are clearly ascertained, and it is the duty of every physician to exercise all his influence in the prevention of this fatal scourge.

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* For a more detailed account of the pathology of Cholera Infantum, see Appendix to Billard, p. 580, et seq.

Even among those whose circumstances have placed them above the effects of poverty, an inattention to the ordinary rules of hygiene is often apparent; and from crowding too many children in one room and one bed, and carefully excluding the air, they are exposed to all the bad effects of heat and a contaminated atmosphere. Often before the appearance of this or its kindred diseases, children may be seen to suffer from the effects of heat and stagnant air, languid and sweltering from the accumulated heat of the night.

How easy, then, is it for those whose situation in life enables them to adopt the proper measures to counteract the effects of excessive heat, to use these simple prophylactic measures. The doors of all the bed-rooms should be thrown wide open; and no danger need be apprehended from leaving the upper sash of a bed-room window a little open at night, to allow of a free passage of air, while the bed is so removed as not to be affected by the current.

During the extreme heat of the summer, especially, should all feather beds, and every species of bed-clothes calculated to retain heat, be removed, and a hard mattress be substituted, while the body is lightly covered. In the daytime, a still freer circulation of air should be encouraged, by keeping opposite windows open. Every opportunity, also, should be embraced in fine weather, for procuring the advantage of a change of air, by means of the numerous advantages now afforded for expeditious aquatic jaunts.

One of the most important measures which has been recommended by all experienced practitioners, and the good effects of which I have in many instances seen, is the administration of cold water to children. The activity of the nutritive process is very great in all young animals; and in proportion to the activity of the capillary circulation, is the demand for a supply of fluid, lost in building up the frame; in addition to this, the cutaneous transpiration, during high atmospheric heat, increases the demand for fluid. All persons who have had any experience in the wants of young children, know how frequent is the demand for drink, especially at night. Sucking infants experience the same distressing want, but are unable to express it in language always to be understood. Extreme restlessness and fretfulness may often be calmed by a draught of cool water; and the allaying of simple uneasiness in infants, is itself a most important measure for the prevention of disease, where the nervous system is so susceptible to impressions as at this tender age. Besides these measures, it is obvious, from the preceding remarks, that too much care can not be bestowed on the food that the child takes, undigested nourishment being a continued source of irritation to the tender mucous membrane.

All these preventing measures are also applicable to the disease, subject, of course, to such modifications as the nature of the existing symptoms will suggest to the medical attendant.*

In the forming stage of the disease, from the view here taken of the agency of the liver in the formation of the disease, it is evident that the first step in the treatment would be to abstract blood, perhaps by means of leeches. This, however, is rarely the course which can be adopted, from the disease having already made considerable progress before the physician is called to prescribe, and the effects of the congested state of the liver having already appeared.

It is the custom of some practitioners to give emetics at the commencement of the disease, to remove acrid and irritating ingesta; this practice, however, can not be too highly reprobated. It is seldom that the immediate cause of the disease in question can be traced to the presence of any indigestible matters in the stomach, which require removal; for, in by far the greatest number of instances, the appetite has been for some time impaired, before the disease is fully formed. The great irritability of the stomach during the progress of the disease, and the necessity and difficulty of controlling its morbid activity, render it extremely hazardous to adopt any measures which might produce one of the most unmanageable symptoms of the disease.

These remarks do not apply, however, to the removal of irritating feculent matter contained in the bowels, and which is usually in a state of putrefaction and fermentation, adding thereby greatly to the existing irritation; any of the mild cathartics already mentioned, but especially the sulphate of potash, may be used for that purpose. But as one of the indications in the cure of this disease is to excite the liver into action, and thus relieve its congested state by free secretion of bile, the use of calomel will be found the most efficacious, both in evacuating the bowels, and restoring the healthy action to the liver. All our efforts will be useless until this organ is brought to its normal state, and our other measures will be without avail, unless its full activity is restored. When this is accomplished, the free circulation of blood from the intestines is secured, and the turgid and congested state of the remote branches of the portal vein relieved.

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* For full remarks on the Prophylactic Treatment of Cholera Infantum, see a paper by the late Dr. Parrish, in the second volume of the N. A. Med. and Surg. Journal.

This important step in the treatment should therefore receive our earliest attention; we should, on this account, as the most effective means both of removing the irritating contents of the bowels, and restoring the action of the liver and of the whole glandular system, resort to mercurial remedies.

The use of calomel in the treatment of cholera infantum, was first recommended by the late distinguished Dr. Edward Miller, of New York, in the New York Medical Repository, for the year 1800. The advantages arising from its use have been appreciated by all practitioners since his time, and it constitutes the basis of the treatment of the disease in every part of our country.

Dr. Miller was in the habit of using it according to the peculiar circumstances of the case, and observes, that it is difficult to determine the question with precision as to the proper dose, for it should be accommodated to the age, constitution and habits of the child, and to the different stages of the complaint. As a general rule, he gave to a child of two years, a pill, composed of one-sixth of a grain of opium and a third of a grain of calomel, every second, fourth, or sixth hour. The proportions of calomel and opium to be varied according to the necessity of astringing or opening the bowels.

This method, and that recommended by Dr. Dewees, of giving small doses of calomel uncombined, I have found useful; and these are suitable to different conditions of the system. The latter is more useful in the first stage of the disease, before it becomes necessary to attempt the control of the excessive and debilitating serous discharges, and when the calomel appears to pass off without any influence on the liver.

The use of calomel should be continued until a manifest alteration has taken place in the stools, and a free secretion of bile is evident from their appearance. This is the main object to be attained; for a general change in the system immediately ensues, on the restoration of the hepatic action.

Calomel, in every instance, had better be given in a small quantity of simple syrup, whereby it is in general more easily swallowed than if given dry. The quantity of the medium in which it is given ought to be very small; any disordered action of the stomach will thereby be prevented; for every preventive measure ought to be adopted, to anticipate, if possible, the occurrence of vomiting—a symptom exceedingly difficult to control when once established.

In cases where much fever attends, beside the local abstraction of blood, small doses of ipecacuanha have been at times found useful, from its diaphoretic action. Although highly beneficial under such circumstances, its emetic qualities will render its employment occasionally hazardous; much judgment will, therefore, be necessary in deciding on its employment. It ought neither be rejected altogether, nor should too much reliance be placed on its use. It should never be employed in such a manner as to take the place, under any circumstances whatever, of calomel, at the commencement of the disease. Where much febrile action prevails, they may be judiciously combined; and if vomiting ensue, Dover's powder may be substituted for ipecacuanha.

The inflammation of the mucous membrane is also allayed by the employment of mucilages. The use of these in some measure supplies the loss of the natural mucus, which, as in dysentery, is continually thrown off; for although the increased action of the blood-vessels causes an increased quantity of mucus to be secreted, yet the preternatural action of the intestines causes a larger quantity to be passed off from the bowels. Decoctions of linseed, slippery elm, gum-syrup, therefore, should form part of the general treatment, with other more active agents. These are more particularly called for, when tormina and tenesmus are the urgent symptoms of the disease. They may be given both by the mouth and in enemata, as recommended in dysentery.

The warm bath is among the general remedies of unquestionable value, more especially applicable at the commencement of the disease, before much prostration has occurred. The effects of warm water, thus applied to the entire surface of the body, produce a dilatation of the cutaneous exhalents; an acceleration of the circulation ensues, while the cuticle is softened, and a diaphoresis, almost of necessity, will follow its use.

Such are the general measures the best adapted to the cure of cholera infantum, and are those which we should adopt in the onset of the disease, and which, with occasional modifications, ought to be used throughout its course. There is scarcely a case, however, in which some considerable alteration is not required in the management, from the persistence of some violent symptom, which itself may very materially interfere with the proper use of the appropriate remedies, or become an agent of severe and protracted irritation, and which it will be necessary to counteract with some particular means adapted to the nature of the existing symptom.

Vomiting is one of the most obstinate symptoms of the disease, and while it continues incessantly tormenting the child, the administration of the proper remedies for the relief of the constitutional symptoms is of little avail. It must be, for a time at least, arrested, before the appropriate remedies can be introduced into the system; it will therefore claim no little share of the physician's attention.

Among the most useful anti-emetics is lime-water, which should be combined with an equal quantity of fresh milk, to remove the excess of its pungent qualities. This should be given by the teaspoonful, every half hour; at the same time, toast-water ought to be given as a common drink. The quantity must be very small, otherwise the fluid will increase the vomiting: it should be barely sufficient to moisten the mouth.

Dr. Dewees particularly recommends strong coffee, without either milk or sugar, as an anti-emetic; this I have found at times to succeed, when other means have failed. while at other times it has apparently aggravated the vomiting. The obstinate nature of the vomiting will often require the trial of almost every remedy which has been suggested for its relief. A drop of laudanum will sometimes control this symptom. A transfer of irritation to the lower intestines is also an important measure of relief, for it does not exist to so violent an extent when there exist much tenesmus and secretion from the large intestines. The injection recommended by Dr. Dewees is very useful for this purpose, consisting of two or three teaspoonsful of salt dissolved in a gill of warm water. Should there be much febrile action accompanying the vomiting, a leech or two applied over the region of the stomach may be required to remove the local inflammation; where this does not exist, counter-irritation, by means of sinapisms or other stimulant applications, or a blister, will at times be found useful. Among other remedies for arresting inordinate vomiting is the spirits of turpentine, as recommended by Dr. Condie, in doses of ten to thirty drops, three or four times a day.

Instead of vomiting, tenesmus is occasionally the most distressing symptom of the disease; this should be allayed by the use of opiate injections, for the continued existence of this symptom is exceedingly wearing to a young infant, as is evident from the great exhaustion which often follows a paroxysm. Before recourse being had to opiates, the effect of simple mucilaginous injections should be tried, as the presence of indurated fecal matter may be the principal cause of this symptom. The directions given for the treatment of dysentery are applicable to the state of the bowels in the present disease, which produces this symptom.

During the prevalence of the disease, although free serous evacuations may continue, the ordinary feces are apt to be retained; this may be suspected to be the case when the abdomen becomes tumid, and the alvine discharges have undergone no alteration. If the calomel has failed to procure an evacuation of feces, a laxative, composed of magnesia and rhubarb, formulæ for which will be found in the article on diarrhœa, will be proper, to remove the acrid and highly irritating contents of the bowels. There is often acid existing in the stomach and bowels in this disease: for, from the absence of bile, no neutralization takes place; and dissections of those who have died, exhibit the presence of a frothy, acid matter, in different parts of the bowels; the combination, therefore, of some alkaline or absorbent remedy, will most likely be called for from this probable condition of the system. When there is no fever present, aromatic syrup of rhubarb, with magnesia, will be found a useful prescription.[*] The object being simply to relieve the bowels of the load of irritating feces, such measures are indicated which will at the same time tend to produce an astringent effect on the exhalent vessels of the mucous membrane of the bowels.

The opposite condition of the bowels more frequently exists than the one just described, the active peristaltic motion rapidly passing off everything contained in them, while the excessive discharge of serous fluids suddenly and fatally prostrates the child. The physician, therefore, is more frequently called upon to control this flow, which may be judiciously done, without interference with the general measures which it is necessary to adopt, to remove the chief pathological condition on which the disease depends.

Opium, at the commencement of the disease, should never be used, except under the circumstances already mentioned, when speaking of its union with calomel. As to the administration of laudanum at once, for the purpose of arresting the discharge, nothing can be more pernicious.

The precautions in the use of astringents have already been mentioned, when treating of diarrhœa in general; and the present disease may be regarded as an aggravated form of the serous diarrhœa attendant on teething, with the complication of a congested and enlarged liver, from causes already mentioned. A great deal caution therefore is required, to adapt the remedies to the actual situation of the patient, neither rejecting nor using too indiscriminately such measures as will at once arrest the most prominent and wasting symptom of the disease.

Although, in general, astringent remedies should be avoided until the free secretion of bile is established, yet, when the disease is protracted, and the child rapidly sinking from the excessive ex-

[*] ℞ Magnesiæ, gr. xv.
Syrup. Rhei, Aromat., ʒiss.
Spts. Nit. Dulc., ʒj.
Sacchar. Alb., ʒj.
Pulv. g. Acaciæ, ʒij.
Aquæ, ℥ij. M.
A teaspoonful every two hours.

haustion produced by the large serous evacuations, it will be advisable to have recourse to some of the astringents already mentioned.

Dr. Mann is the first who recommended the acetate of lead as one of the most efficient astringents in the treatment of cholera infantum. Administered in combination with opium, there appears to be but little hazard in its use. Strongly prejudiced against the internal use of lead, I have not given it the trial which the experience of others should have led me to do. But in those cases in which I have used it, although disappointed in its effects, the anticipated evils never appeared.

From the experience of others, however, it is one of the most efficacious astringents; and Dr. Lindsley, of Washington, D. C., remarks, that there is not a more efficient remedy in the whole materia medica than sugar of lead and Dover's powder, in doses carefully proportioned to the age and condition of the patient;[*] it acts far more kindly than either kino or catechu. His prescription is subjoined.[†] Various other astringent remedies may be tried, as already recommended; for at this stage of the disease it bears much the characters of chronic diarrhœa, which attends a simple exaltation of the action of the muciparous follicles without inflammation, where astringents are clearly indicated.

As a part of the general treatment of this and of all the other diseases of infancy, the gums should be carefully inspected, and where they are found swollen from the pressure of a tooth, they must be divided; not that the pressure of the tooth can itself be a cause of this disease, but the irritation it produces in the system is a great source of aggravation to all the symptoms; and where there is so much tendency to a flow of blood to the head in all abdominal affections in children, the local irritation of the tooth should be removed, as the tendency to cerebral turgescence is thereby prevented.

The disease is often exceedingly protracted; and even after an apparent removal of the symptoms, a slight error in diet, or a little change in the temperature of the atmosphere, will cause a return of the symptoms, even after some weeks have elapsed; the disease for the most part being a serous diarrhœa, and in part arising from a morbidly relaxed condition of the serous exhalent vessels, while the continued action of the exciting causes still keeps the liver in a congested condition. Mild bitters, therefore, and gentle tonics, are indicated during the interval of relief. Infusions of Columbo root, weak infusion of ginger, will be found highly useful in imparting tone to the relaxed state of the intestines; while stimulating diet will be needed for the same purpose. The instinctive desire of the child for salt and other stimulating articles of food, may in moderation be safely gratified. In cases which are evidently kept up by debility, more powerful tonics may be used; and the sulphate of quinine, in minute doses, has been given with great benefit. Iron is also a useful tonic in such cases. The following prescription of Dr. Chapman is an excellent formula for its administration.*

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[*] Remarks on Cholera Infantum, by Harvey Lindsley, M. D.; Amer. Jour. Med. Scien., vol. xxiv., p. 311.

[†] ℞ Plumbi Sub. Acet., gr. iv.
Pulv. Doveri, gr. j. M.
ft. Pulv., No. xij. M.

One every hour, or every second hour, according to the urgency of the symptoms and effect of the medicine, for a child of eighteen months.

It is certainly a very remarkable symptom of convalescence in this disease, that there is so strong a desire for salted meat and fish; and a piece of fat salted pork is greedily seized, and relished by the child, when all other kinds of food are rejected. Drs. Rush, Parrish, Hosack, and other distinguished physicians, have remarked that children may be indulged in this instinct with obvious relief to all the symptoms. The juice of shell-fish, also, may be used with advantage during convalescence.

This eager desire for stimulating food affords a striking illustration of the pathology of the disease, and of the inordinate and diseased development of the parts that are at this time of life undergoing a change, for the reception of a new kind of food.

During convalescence, especially, if the child's appetite should have been good, on the appearance of a return of the diarrhœa, a dose of castor oil should be given, or a little syrup of rhubarb; the latter may be combined with magnesia, if acidity appear to be present. And in general, the ordinary measures already recommended ought to be pursued; but modified to suit the case of the child, in the debilitated condition following a protracted disease.

HEPATIC AFFECTIONS.

Diseased action of the liver, unconnected with excess of biliary secretion, is not of unfrequent occurrence among children, especially during the summer and autumn. A congested state of this organ always precedes some forms of intestinal disease; a subject which has already been considered. A deranged action, however, in the circulation of the liver, and an enlargement of its substance, may occur, without manifesting its presence in the increase of its secretion, or in the production of derangements of other portions of the abdominal viscera. These affections seldom, if ever, appear in the form of inflammation, and if ultimately fatal, become so by producing other diseases. We are therefore left without any autopsical examinations to guide us as to the exact condition of the liver, in a disease which is not frequent in some districts of country. I have sometimes detected the existence of arrested circulation of the liver, and, by the early application of suitable remedies, have removed the morbid condition, which at other times appeared to be directly connected with the formation of other and fatal affections of the bowels.

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* ℞ Sal. Martis., gr. ij.
Acid Sulph., gt. x.
Sacchar. Alb., ʒj.
Aq. Font., ℥j. M.
ʒj. p. r. n.

Etiology.—Hepatic congestion forms the most common complications of abdominal disease in the United States, and particularly in newly-settled districts of country, and is especially dependant on the malaria which abounds in such places. The extreme heat of the summer is also another cause, and it is at this season that diseases of the liver prevail in cities, and other situations not exposed to the malaria of marshes. Improper food is also another cause, particularly in children about the age of two years, who have been kept exclusively fed on farinaceous articles of diet. Although many have thrived under such a course of diet, yet there are some who at this age require a decided change of food, and that composed partly of animal substances can not be withheld without injury.

Semeiology.—Its approach is very insidious, and at first exhibits no other sign than listlessness, slight fever, loss of appetite, and a furred tongue. The accompanying fever is for some days, and even weeks, of daily occurrence, the paroxysms coming on in the afternoon. The stools are usually more deficient in bile than when in a healthy state; and in one case which I have recently seen, were entirely white. This child was invariably attacked with convulsions whenever the alvine evacuations gave evidence of the deficiency of the biliary secretion. After the disease has continued for a few weeks, a sensible enlargement of the right hypochondrium may be discovered on a close examination. Cough will often be present with the other symptoms; but the absence of expectoration, and the stethoscopic signs, will be a sufficient diagnostic mark of the nature of the cough.

Treatment.—This must be directed according to the vigor of the child. In general, this congestive condition of the liver, and the inflammation of the mucous membrane, which is usually its attendant, demand the early employment of blood-letting, either by means of leeches or the lancet. It is by the early adoption of this course, that some of those fatal affections of the bowels, so common in our country, are to be prevented.

It is indeed rare that the physician is called to see a child in the forming stage of these affections; but if there exist any of the evidences of hepatic disease, it may be regarded as a precursor of such diseases; inflammation of the mucous membrane of the bowels, or cholera infantum, so frequently following such a condition of the liver. The loss of blood, therefore, is one of the most important remedies, and should in all cases precede the administration of other remedies. Cathartics especially should be avoided until after the abstraction of blood, and then those only of the mildest character employed. Dr. Martyn Paine has some very judicious remarks on the treatment of diseases of this nature;* remarking that the lancet is far preferable to leeches, especially after the age of two years; and at all ages, when there is much arterial excitement, it requires blood-letting in some form, as much as any disease of childhood. When the child is unable to bear the loss of blood from the arm, leeches to the anus are indicated. Bleeding from their bites should be carefully watched, as, from the highly vascular condition of the part, it may become excessive. This course, with the warm bath, and fomentation, or poultices to the abdomen, and occasional doses of castor oil, will almost certainly effect a cure, especially when aided by a proper diet.

CONSTIPATION.

Costiveness in children demands an early attention, from whatever cause it may proceed. In the aged, on the contrary, although it should be obviated, yet the hazard of leaving it unattended to is not so great as at the other extreme of life, when digestion and assimilation are very rapidly performed.

Besides this ordinary costiveness, arising in sucking infants and children, that species occurring immediately after birth, and usually known by the retention of the meconium, very properly comes under the present head. It will, on this account, be regarded as one kind of constipation peculiar to children.

Etiology.—The remote cause of this condition is often difficult to ascertain. In newborn children it may sometimes arise from pressure on some portion of the mass of the nerves, whereby the bowels are in a degree paralyzed. The peristaltic motion, however, being of an involuntary nature, is but little under the influence of the nervous system, continuing, it is said, even after the division of the eighth pair of nerves, and becoming more active, Magendie asserts, as animals become more debilitated. According, however, to the statements of MM. Tiedemann and Gmelin, by the mechanical irritation of the eighth pair of nerves, in the plexus surrounding the œsophagus, the peristaltic action, both of the stomach and intestines, is increased. If this be so, the converse must also be true; and the defect of stimulus, in some degree, would arrest the motion of these parts.

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* Medical and Physiological Commentaries, by Martyn Paine, M. D., A. M.: New York, 1840; vol. ii., p. 523.

The small quantity of the meconium may also be the cause of its retention; for experiments have shown that the peristole is more distinct, the greater the quantity of the contents of the intestinal tube. A practical deduction may be drawn from this fact, as it warns us not to be too anxious to administer to young infants purgatives, on the non-appearance of the meconium, but wait until the natural actions are excited by the means which nature has provided.

The peristaltic motion appears also to be in some measure under the control of the neighboring organs; for at every inspiration, the stomach is pressed on by the diaphragm. Free and strong respiration, therefore, and the crying of the infant, will often effectually excite the action of these parts.

Tissot considers the spasmodic condition of the sphincters of the anus as occasionally a cause of the retention of the meconium. Such can hardly be the case; but it is probably connected with a want of energy in the muscular coat of the intestines.

Older children often become exceedingly costive, from the qualities of the nurse's milk, when sucking, or from some accidental cause connected with the nature of the food, or a sluggish state of the liver.

Habitual costiveness is often observed from very early infancy, and appears to be strictly an hereditary affection. This should be early attended to; for although there does not exist so much danger in costiveness arising from this cause as from the others, yet it can not continue long without producing unpleasant symptoms, such as colic, flatulency, etc., and even ultimately, as I have seen, becoming a cause of inflammation and dropsy of the brain. During the period of lactation, it is not unusual for mercenary nurses to give laudanum frequently to the children under their care, for the purpose of quieting them. This habit is invariably followed by a costive state of the bowels. Not only do opiates produce this effect, but the habitual use of purging medicines is generally followed by a similar state of the bowels: the former causing it directly by its sedative effect; the latter indirectly, by destroying the irritability of the mucous membrane, and thereby rendering it insensible to the ordinary stimulant of the food, or biliary secretions, and causing the repetition of larger doses of cathartic medicine necessary to procure the requisite discharge from the bowels. The effect of an ordinary cathartic is always to cause a costive condition to follow.

Semeiology and Pathology.—These do not demand much notice, as much that relates to them has already been described under the preceding head. It will suffice to observe, that after the meconium has passed, the child usually has from two to four alvine discharges daily, of a light yellow color, without fetor or any acid odor, and free from curdy substances or solid lumps. From the rapidity of the digestive process, defecation is a frequent act, especially in young children, and on this account their bowels are often freely moved, having not less than two discharges in the day. When, therefore, but one is observed to occur in sucking children during that period, measures ought to be forthwith adopted to secure to the bowels their normal action; for even this deviation is a sign of disorder sufficient to render the interference of art necessary. Such a change will sufficiently point out the disease, without waiting for its more distressing symptoms of colic, abdominal inflammation, or even convulsions, to which it sometimes leads.

The pathology of the disease, generally speaking, is in the torpor of the peristaltic motion of the bowels, or in a want of tone in the part. These two conditions usually exist together, unless the want of action has been induced by the habitual use of narcotics.

Treatment.—It has been supposed by many that the meconium exerts an injurious influence on the mucous membrane, and consequently affects the health of the child, and that its speedy removal is necessary. It is, therefore, a very common practice, almost immediately on the birth of the child, to give it a dose of castor oil, to insure an evacuation of this substance. It however possesses no irritating or chemical quality, by which it can be injurious, in any other way, than by a prolonged retention of it in the bowels, when symptoms arise like those attendant on obstinate costiveness. It is, therefore, unnecessary to resort immediately to measures for its removal, as means are naturally provided for this purpose. The peculiar properties of the colostrum make it a natural laxative. The milk first secreted contains more serum and butter, and less caseum; the microscope detects a difference in the milk globules, which are irregular, and have more the appearance of oleaginous particles than of these globules, and exhibit a larger proportion of fatty matter. For these and other interesting facts we are indebted to the researches of Dr. Donné.* If it is left, therefore, to the operations of nature, it will be found that the meconium will be discharged in most instances without artificial assistance. The use of any medicine must, as a general rule, be regarded as injurious, as the object of medicine is but to create a temporary disease for the removal of another; and only applicable when the disease demanding it is itself the greatest source of danger. How great is the hazard, therefore, to commence by giving the child, when uncalled-for, active medicine, which at once creates a diseased action in the tender mucous membrane, the healthy integrity of which it is so necessary to preserve, where digestion forms the principal part of the actions of the economy.

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* British and Foreign Medical Review, vol. vi., p. 182.

Where, however, the meconium is retained for three or four days, and the child manifests the uneasiness attendant on costiveness, it will then become requisite to interfere for its removal. This should be at first attempted by an enema of simple warm water, or of molasses and water. If this is not sufficient, a teaspoonful of castor oil, as the least irritating, will generally suffice for its removal; but even this should, if possible, be avoided, as the good effect following the use of cathartics, in any form, is often overbalanced by the disturbance of the system, which not unfrequently ensues on the early commencement of medicine.

If the secretion of milk do not take place in two or three days, it will be necessary to feed the child with a little milk and water sweetened; this of itself will generally excite the intestines to action. It has been the custom in Germany to give the child nothing more than a lukewarm water, before the secretion of the milk. A little milk and water is probably the best, as it approaches more closely to the natural nourishment of the child.

Should a tumefaction of the abdomen be observed, together with the usual symptoms of colic, shortly after birth, without any appearance of the meconium, and especially if measures have been used to open the bowels, we may have reason to suspect an imperforate condition of some of the lower intestines, which may be ascertained on a proper examination, which should always be made.

It sometimes happens, in consequence of the intestines being lined with a thick, tenacious mucus, that the bowels remain inactive, notwithstanding the use of the measures above-mentioned; enemata may, under these circumstances, be made more stimulating, by a mixture of castor oil. A suppository of soap will also be found efficacious in exciting the motions of the intestines. It is much better to resort to these measures, in almost all their varieties, than to use any active or stimulating cathartic, as the meconium is almost always found in the large intestines, being the progress of fœtal digestion, and resembles the feces in the colon and rectum of an adult. So uniform is this result, where opportunities have occurred to examine newborn infants after death, that where it has been found in the small intestines, it has ascended there, in all probability, by a true anti-peristalic movement, as it is evidently no more its proper situation than that of ordinary fecal matter. Remedies, therefore, are more suitable to these cases when given by the rectum, as it is the lower intestines alone which require stimulating.

When sucking infants are troubled with constipation, the mother or nurse should pay particular attention to her food, and use such as is of a laxative nature; for all the means used for its removal, by giving laxatives to the child, are generally but temporary in their effects, and ought only to be used to relieve urgent symptoms. It is often sufficient for her to take occasionally a purgative of some of the neutral salts, which, if largely diluted, will reach the circulation and impart a laxative quality to the milk. This, together with some change in the infant's diet, will in most instances effect a change in its habit. Let the child therefore be fed, in addition to what it sucks, with a little chicken water, milk and water sweetened with brown sugar or molasses, or with manna dissolved in it by boiling.

Should these means fail of relieving habitual costiveness, while the mother continues the use of occasional doses of aperient salts, the child's abdomen may be covered over with a poultice, on which a little pulverized jalap, or rhubarb has been sprinkled. As before remarked, we ought to avoid the use of purgative medicines in sucking children; but when they become necessary, those of the most unirritating nature should be used; such, also, as are recommended below, proportioned to the age of the child, may be employed.

Older children are at times troubled with costiveness, which, for the most part, arises from the quality of their food; this is much more easily cured than if it occur from any hereditary predisposition. An alteration in the ordinary diet is the first step; and among the best articles to be used with the daily food, is ripe fruit: children always crave it, and when perfectly ripe and fresh, may freely be allowed its use. A large draught of cold water, taken early in the morning, will often relieve it. In place of ordinary table salt, phosphate of soda may be used in their food; its taste nearly resembles that of the muriate of soda, while its laxative properties are much greater. From its pure saline taste it makes an admirable laxative for children, and may be given agreeably to the subjoined prescription;* or cream of tartar, in combination with other laxatives, will be found useful.†

Some tonic laxative may be at times necessary, and the syrup of rhubarb is a good medicine where such a purgative is required. In general, however, either of the subjoined formulæ will be adequate to the removal of costiveness, if attention be at the same time paid to the food.[*]

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* ℞ Sodæ Phosph., ℥ss.
Aquæ Bull., q. s.
Amyl. Marantæ, ℥ss.
Sacchar., q. s.
ft. Gel. To be taken ad libit.

† ℞ Potassæ, Sup. Tart., ʒij.
Mannæ, ℥ss.
Aquæ Fervent., ℥iv.
Syrup. Aurantii, ʒiij. M.
One half to be given at bedtime, and the remainder in the morning, to a child from four to eight years of age.

In some obstinate cases, calomel, jalap, and scammony may be required; other measures ought, however, to be faithfully tried, together with the assistance of suppositories, or enemata, simultaneously, before drastic cathartics are resorted to.

In the Hôpital des Enfants, where there is great experience, from the multitude of cases, the subjoined prescription is in common use, when the cases are extremely obstinate, and it is said, by M. Jadelot, with uniform success.[†]

Aloes has at times succeeded, when most other measures have failed. Dr. Dunglison prescribed with success, in a child twelve months old, a drachm of aloes, in an ounce of simple syrup; a teaspoonful of which was given every two hours, together with a grain of calomel and four grains of jalap, which had been previously administered. This was resorted to after ineffectual attempts had been made to procure a passage from the bowels by other powerful means. The whole of this syrup was taken before an evacuation followed. Another child, aged six months, took three drachms of aloes before the bowels were moved.

It is well not to persevere in the use of powerful cathartics, but to resort to other measures where the constipation is obstinate. The general relaxation produced by a warm bath, together with leeches to the abdomen, will often have a very decided effect in unlocking the secretions in the abdominal viscera. Frictions, also, with camphorated oil, to the lumbar region, have been recommended to stimulate the nerves of the part.

WORMS.

The existence of parasitic animals in man has been long a matter of observation, and from a very remote period the subject of speculation; for it appears to have received the special attention of Hippocrates and Galen. Pliny, also, notices the presence of worms in various parts of the bodies of men and other animals.

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[*] ℞ Fol. Sennæ, ʒij.
Pulp. Tamarind., ℥j.
Sem. Coriand. Contus., ʒj.
Sacchar. Com., ℥ss.

Macerate for four hours, and strain. Two tablespoonfuls for a child of three years.

℞ Inf. Sennæ, ℥ij.
Pulp. Prunæ, ℥iv.
" Tamarind., ℥ss.
Syrup. Simpl., lbj.
Ol. Carui., gt. xx.
ft. elect.

A teaspoonful for a child three or four years, at bedtime.

[†] ℞ Fol. Sennæ, ʒiij.
Sodæ Sulph., ʒij.
Mannæ, ℥j.
Aquæ, ℥iv. M.

Steep the senna for four hours in boiling water, then add the salts and manna. A tablespoonful of this mixture to be given repeatedly, until an evacuation is produced.

In addition to those of the class of intestinal worms, which is the subject of the present chapter, a vast number of the insect and reptile tribe has been described as existing in various parts of the body, as well as within the intestinal tube. The writings of Schenkius, Marcellus Donatus, Borelli, and others, contain, also, descriptions of various kinds of animals, besides insects, that have been discharged from the body, such as frogs, lizards, serpents, etc.; while every organ of the body, even the blood-vessels themselves, have been found, by the microscopic philosophers, to be the abode of numbers of animalculi.[*]

Some of these accounts, written during the sixteenth, and at the commencement of the seventeenth century, are great exaggerations of some simple occurrence, similar to what is seen at the present day; for occasionally there have been voided both larvæ and perfect insects, of forms entirely different from intestinal worms, so commonly discharged from the bowels of children, and to which a fruitful imagination has given the appearances above mentioned. Such instances have sometimes been met with; and Dr. Bateman mentions the discharge, from the anus of a young woman, of several larvæ of the Tenebrio *molitor*, L., or meal worm; and in another instance, of the larvæ of the Musca *domestica*, or common fly. He also refers to Forestus, as describing a species of caterpillar by vomiting, and of the dejection of several scarabei. Accompanying the paper of Dr. Bateman, are figures of grubs, seen by Dr. Cheyne, which were discharged from the bowels.[†]

It is unnecessary, and entirely foreign to the object of these remarks, to enter into an account of the supposed insect origin of various diseases. Measles, small-pox, hydrophobia, syphilis, petechiæ, elephantiasis, and numbers of others, have been referred to the presence of insects in the different tissues, as their cause. The morbid effects of marsh malaria have, by some ancient authors, been attributed to myriads of animalculi suspended in the air, and entering the body in the act of inspiration. Such ideas, however, are but the speculations of the imagination; having no foundation in fact, for they are destitute of the least proof adduced for their support.

It is only to that class of entozoa, which so commonly infests the intestines, and becomes either the cause of much disease and suffering, or the evidence of a great loss of energy in the digestive system, and thereby needing the interference of art for their removal, that the present remarks are necessarily limited.

It is certainly a strange idea, which was advanced some years

[*] Hist. Naturalis et Med. Latorum Lumbricorum intra Hominem et Animalia Nascentium, Auct. D. Le Clerc, 1718.

[‡] Account of Larvæ, etc., discharged from the Human Bowels, by T. Bateman, M. D.; Ed. Med. and Surg. Journ., vol. vii.

since by Rœderer, and Wagler, in his treatise on the mucous disease, that they are useful for the consumption of superfluous nourishment, and thereby prevent plethora. Dr. Butter, also adopted the same views, and considers them of very little importance in the production of disease in children. He thinks that although they may exist in disease, they are neither the cause nor a symptom of disordered affection. He regards them as positively useful, by their movements, in promoting the peristaltic motion of the bowels, and thus assisting in the evacuation of the morbid secretions. Dr. Rush, also, from the frequency of their occurrence in all animals, without apparently being accompanied by disease, is disposed to adopt the opinion, that they are in some respects useful, in consuming the superfluous nourishment which all young animals so freely take, and even suggests the idea, that perhaps some children may be disordered for want of them, as they are found, he says, more frequently in stout and vigorous children, than in others. He is of opinion, also, that there exists no such disease as the idiopathic fever, which has by some been attributed to worms; and adopts the views which have been held by the aborigines, that the discharge of worms is to be referred to the fever, and not the existence of fever to the worms. In some cases, however, he admits that they cause anomalous symptoms, which call for the use of anthelmintic remedies in combination with others.*

A number of monographs have been written on the subject of intestinal worms, but the best which has appeared on the subject, probably, is the classical production of Rudolphi.† It is unnecessary to consider the five different families, and their various species, which are treated of at large by this author, and by Frank,‡ as some of them are not intestinal worms, the only species which naturally forms the subject of the present essay. A compendium of the natural history of all these entozoa, will be found in Dunglison's Commentaries on the Diseases of the Stomach and Bowels of Children.

The worms that chiefly infest the intestinal canal of children are the following: the Ascaris *lumbricoides*, Tricocephalus *dispar*, Oxyuris *vermicularis*, Strongylus *gigas*, Distoma *hepaticum*, Tænia *solium*, Tænia *lata*.

The ascaris *lumbricoides*, or long round worm, resembles very much the common earth worm, (Lumbricus *terestris*, L.) It is found in every part of the intestinal tube, and has even been found in the pancreatic and hepatic ducts, and occasionally in the gall bladder. Sometimes it has been vomited from the stomach, and is even seen in the œsophagus and pharynx. Andral mentions the case of a child who was suddenly seized with convulsions while apparently in good health, and died with symptoms of suffocation. On post-mortem examination, one of these worms was found to have ascended from the stomach, and attempted to crawl into the glottis, which caused the spasmodic closure of the orifice and the death of the child. At other times they have been seen entirely in the air-passages, having probably ascended the œsophagus, and found their way into the trachea, and even the bronchiæ, before they produce death. A case of this kind is recorded by Haller, of a girl aged ten years, who died from suffocation, caused by two of these animals in the trachea.* M. Blandin also mentions the case of a child that was suffocated by a large Ascaris *lumbricoides*, which had found its way into the trachea and right bronchiæ.† A still more remarkable case is recorded in the Archives Gen. de Méd., for January, 1836, where thirty-seven of these animals were discovered in the trachea and bronchiæ of the right side. The patient was suddenly seized on the third day before her death with dyspnœa and general distress, which increased until she died from convulsions. Besides those seen in the air passages, there were thirty-six in the intestines.

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* Enquiries, vol. i., p. 203.

† Entozoor. sive Vermium. Intest. Histor. Nat. Anctore Carlo Rudolphi; Amster. 1811.

‡ De Curand. Hom. Morb. Epit., Lib. vi.

They have at times existed in immense numbers, and passed off, rolled together in the form of a ball. The color of this worm is generally a pale red, but it occasionally varies from this, according to the color of the fluid in which it happens to have been lodged. Its length is usually three or four inches, and it has been found even as long as fifteen inches.

The Tricocephalus *dispar*, or long thread worm, is about an inch and a half to two inches long; the head is acute; the body striated on the fore part; the tail about twice the length of the other portion, and terminates in a hair-like point. The color of this animal resembles the preceding, and like it, is also found in the horse, ox, ass, and hog. It usually inhabits the cœcum of sickly children, and is rarely in any other part.

The Oxyuris *vermicularis*, maw-worm, or thread-worm, has the appearance of the ends of thread. The name maw-worm is not derived from the occasional migration of this worm to the stomach, but from the sympathetic irritation it creates there. It is usually found about the rectum, and is the kind known by the name of ascarides. These are often also seen in masses, rolled up in the form of a ball, completely covered with mucus. They are more prevalent in the spring than at any other season of the year. They do not remain exclusively in the rectum, but occasionally find their way into the external parts of generation of females, and cause a great itching and leucorrhal discharge. This kind often exists in the intestines of the fœtus and newborn children.

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* Opuscul. Patholog. Lausanne, 1768., p. 26.

† Traité d'Anat. Topographie, p. 199.

The Strongylus *gigas* is a worm of a deep red color, and measures in length from four inches to three feet, and in breadth from two lines to half an inch. It is chiefly found alive in the kidneys, and sometimes, although rarely, in the intestines.

The Distoma *hepaticum*, or fluke, is a flat obovate worm, with a large abdomen. The size of this species is about an inch in length, and from four to six lines in the breadth. Its color is a yellow, greenish, or brown.

It is found in the gall-bladder, and occasionally in the intestinal canal. It is very common in all kinds of quadrupeds, fishes, and reptiles. Although discovered in all parts of the intestinal canal, it is more common to meet with it in the liver; and when abundant in that of the sheep, is the fatal disease among them known as the rot. It is not satisfactorily ascertained whether these parasites are the cause or effect of this disease.

These worms have been seen in the gall-bladder, vena portarum, ductus choledicus, and parenchyma of the liver, and occasionally in the intestines of children that have been from time to time dissected.

The Tænia *solium* has a broad, depressed, articulated body; the joints obtuse, anterior short; the next obtuse, and the remaining oblong. The size of this worm is usually a few feet, but occasionally of great length. Robinus found, on dissecting a man that had died, after having discharged fragments of tape-worm, the worm extending through the intestines, from the pylorus to within a few inches of the anus, and measuring about thirty feet. Bremser mentions a case, in which one hundred and fifty feet of tape worm were discharged by stool. Frank speaks of one forty-seven cubits in length. It has even been stated, that they have been discharged six hundred feet long. This, although enormous, is exceeded by that stated in the Copenhagen Transactions,* where a case is given of a tape worm measuring eight hundred ells, or upward of seventeen hundred feet! Such an extreme length is scarcely credible, and must have arisen from some error arising, perhaps, in the measurement, taken probably at different times, when different portions were discharged.

The tænia inhabits principally the small intestines, where it is often curled up in a roll, and is felt by the patient as he moves about in bed. At other times it is lengthened out to the whole extent of the intestinal tube. It is occasionally exceedingly distressing, from the continual motion, which has been described as a species of convulsions of the animal. Other worms may exist at the same time with the tænia; and both the Oxyures *vermiculares*, and Ascarides *lumbricoides*, have been discharged, with a portion of tænia, on the operation of an active vermifuge.

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* Referred to by Dr. Stokes, Lond. Med. and Surg. Journ., May, 1834.

The Tænia *lata*, or broad tape-worm, is characterized by the head and marginal depressions being oblong, without any neck; anterior articulation rugous; the other broader, and almost square; the last one somewhat elongated. It is nearly flat and measures from ten to twenty feet in length; it is of a white color. This species is of very rare occurrence in the human body.

Etiology.—The most remarkable predisposing cause of worms is climate; at least so it would appear from the writings of Hasselquist, Linnæus, Rudolphi, and Roscoe, with reference to the tæniæ; the tænia *solium* being more common in Egypt, Italy, Holland, and England. In Switzerland and Russia, the tænia *lata* is of more ordinary occurrence than the other species. Neither of these are very often met with in the United States; and tape-worm may be regarded as rather a rare disease in this country.

Childhood is the time of life that greatly predisposes the system to worms; accordingly we find them at every period of childhood. Cloquet mentions, that at the Salpetrière, where none but aged persons are received, there were scarcely any of these parasitic animals found on opening the bodies of the deceased; but at the children's hospital nothing was more common than to find them, and sometimes in great numbers. The Oxyures *vermiculares*, and Ascarides *lumbricoides*, are those most frequently found in children. The tæniæ are rare in children, but occasionally exist in youth.

Other predisposing causes are debility of the digestive organs, whether induced by an hereditary condition, or whether acquired by imperfect or insufficient food, or by a damp, cold, or insalubrious residence. They have been compared by Frank to parasitic plants, which thrive best in poor and uncultivated soil, while the vigorous and fertile fields present but few of these dependants on other living plants and shrubs.

The origin of worms in animals is as unsettled now as it was in the time of Aristotle; and there is no department of medical science, either physiological or pathological, of so much interest, as the presence of worms in the intestinal canal, and the various cavities and tissues of the system. The cause—the origin of their existence—still remains one of the most inscrutable things in nature, and is a subject which has occupied the attention of natural philosophers in every age.

The opinions of those who have made it the subject of investigation may be classed under two heads; those who believe in spontaneous generation, and those who are of opinion that the ova of these animals have been introduced into the body.

Almost all the writers of antiquity adopt the opinion of equivocal generation, and are supported among the moderns by Buffon, Needham, Patrinus, Rudolphi, Bremser, Stokes, and others. It is explained by being a formation analogous to the organization of a portion of lymph thrown out on a serous membrane, which afterward becomes organized, and acquires all the properties of life. When it is separated it becomes an independent animal; the difference being, that in one case the organized mass remains adherent, and in the other is separate, forming a new creature. According to some, intestinal worms are formed from partially assimilated nutriment in the digestive tube; the portion not taken up becoming a living animal.

Those who maintain the idea that they spring from without, and are the product of ordinary generation, are Harvey, Linnæus, Gadd, Unzer, Tissot, Leeuwenhoeck, Müller, Good, and most of the physiologists of the present day. They have endeavored to show that all these creatures have been found in some situation out of the body, as the Distoma *hepaticum* in fresh water; the Tænia *lata* in muddy water, in rivers, and in wells; the Ascarides *vermiculares* in marshes, and about the roots of trees, etc. Wherever a great difference in their appearance is manifest, it is attributed to the effect of a different situation, and a modified development from this cause.

One of the principal difficulties of this theory, is the existence of parasitic animals in the fœtus of different animals, which have at times been discovered. The ovum in such cases must be exceedingly small, to have been received by the mother and transmitted through her blood-vessels and placenta to the fœtus, and there developed into the perfect animal. Rudolphi and Blumenbach have given instances in which tæniæ have been found in the intestines of newborn lambs and puppies; and Forman has discovered the Distoma *hepaticum* in the liver of the fœtal sheep. Entozoa have also been seen in the intestines of the chick which has just broken the shell. Brendel has seen the tæniæ in the human fœtus in utero. Hoking describes a fœtus in which the intestines contained a number of small worms, and another in which a large Ascaris *lumbricoides* was found in the stomach.

To account for all these different occurrences is certainly a difficult subject; but for its explanation we need not resort to the doctrine of equivocal generation. It is not necessary, either, that all the parasites found in animals come from without, and that they exist in ponds or other places, and are first taken into the mouth, either as food or drink; for some appear to be so uniformly found in a particular part of the body, that it would seem to be both their proper nidus and habitation, like other parasitic animals, as the larvæ of certain insects, which find their food and habitation only on one kind of plant. Cuvier observes, that "the entozoa are remarkable, because a greater number inhabit the interior of other animals, and there can only propagate. There is scarcely a single animal that is not the domicil of several kinds, and those which are observed in one species, are rarely found in many others." These parasites have no trachea, nor any other organ of respiration; they therefore do not receive oxygen, except through the medium of the animal in which they live; another strong presumptive proof that their proper habitation is in the animal they inhabit.

It can be no objection to this theory, that the ova have to travel through the entire system, and be deposited in some tissue or cavity, in which the animal is found, even in the fœtus; for the probability is, that the ova are so extremely small, that they may be easily carried through the circulation, and then deposited in some of the cavities. That such may be the case, would appear to be not improbable from analogy. We know that the atmosphere is loaded with myriads of the eggs of the insect tribe, unknown to us until some circumstance occurs which arrests them in their flight, and furnishes them with a proper nidus for their development.

Whatever difficulties there may appear to be in the manner in which these parasitical animals are brought to inhabit the different parts of the animal frame, it is certainly a great assumption to suppose them to exist there by spontaneous generation. Although the multiplication of some of the lower animals by sections, proves that there are other ways of reproduction than by eggs, yet there is nothing in this to prove that any animal can be produced by a spontaneous formative movement; while the existence of different sexes for reproduction, shows their mode of propagation to be like that of other animals. And it is clearly unphilosophical to suppose them to be the result of a spontaneous organization, either of lymph, or of an excess of nutriment in the bowels; which organization, at the same time, also provides them with the organs for a continuance of their respective kinds.

MORBID ANATOMY AND PATHOLOGY.—This is a subject of great importance in the treatment, or rather in the prevention, of worms; for if the positive condition of the mucous membrane of the intestinal tube, on which the existence of these animals depends, could be ascertained, there would be little difficulty in the treatment. Unfortunately, however, it is but little understood in the present state of science, for worms have been discovered in every condition in which the intestinal tube has been found, and even when in a state of health.

It is the opinion of Broussais, that they are the effect of a gastro-enteritis; while Andral states that they have been found in every condition of the intestine, and usually lying in a quantity of mucus, and the little redness which has been noticed around them is rather the effect than the cause of worms. They have been seen in animals of great variety that have presented the appearance of perfect health, and, therefore, it would seem that their existence is independent of any pathological condition other than a modification of vital energy, and therefore not traceable by ordinary dissection. As for the opinion of Broussais, and the practical consequences which result from it, all experience proves its incorrectness; for the most powerful means of relief of some of the serious symptoms of worms, are of a nature which would necessarily aggravate all the gastro-intestinal inflammation. Indeed, he deprecates the use of anthelmintics in the treatment of worms, on account of their stimulating effects on the mucous membrane of the intestinal tube.

SEMEIOLOGY.—It is extremely difficult to ascertain, by any symptoms, the positive existence of worms. Irritation in the stomach and intestines produces so many symptoms in remote parts, from the extensive sympathy of all parts of the body, that it is sometimes even difficult to trace the connexion to the intestinal or gastric mucous membrane; and when it is evidently seated in the mucous membrane of the intestinal tube, it is no less difficult to ascertain with certainty its cause, all irritations in this part producing symptoms analogous to those of worms.

The face is usually tumid and pale; the inferior eyelids of a livid hue; the nostrils itch, with occasional bleeding from the nose. The breath is very offensive, or of an acid odor, and the gums are covered with sordes. The upper lip is usually much swelled; sometimes there is a difficulty in the speech, and even a loss of voice. The eyes are fixed and staring, and at times affected with strabismus; the pupils are often dilated. At times there is pain in the head, and severe convulsions, vertigo, or delirium, sometimes follow a turgid state of the brain. To these symptoms there is added a stubbornness of disposition, or a listlessness, with occasional fits of terror. When asleep, the child appears to be affected with terrific dreams, and awakes in great alarm. The respiratory organs are also sympathetically affected, for the breathing is hurried, and at times difficult. There is also a dry, tickling cough, and sometimes of a convulsive character; pains also affect the chest, bearing a great resemblance to pleurisy. Stethoscopic examination will detect the sympathetic character of the pulmonary affection, and thereby enable us to form a diagnosis of the disease. All these symptoms may be regarded as symptomatic.

The semeiology of the abdominal organs is of more importance, in a diagnosis of the disease, than any of those above mentioned, which, although occurring in some form or other, are, it must be admitted, often fallacious. The appetite is variable, the hunger sometimes insatiable; but notwithstanding a large quantity of food is devoured, emaciation rapidly increases. There are also nausea and vomiting, pains in the stomach and abdomen, and often a sudden enlargement of this part, which becomes tympanitic. Often there appears to exist an indescribable sensation of distress and gnawing in the stomach and bowels. There are also at times severe tenesmus, bloody stools, mixed with mucus, and other symptoms of inflammation in the large intestines. None of these are conclusive; and the appearance of worms in the alvine evacuations is the only positive testimony of their being the cause of these symptoms.

Such are the general symptoms of the presence of worms in the intestinal canal. There are others, which attend the existence of worms of a particular species, which appear to demand some attention. Thus the Ascarides *lumbricoides*, or common round worms, which are usually found in the ileon, although often existing without producing any symptoms of distress, when causing any uneasiness or pain, will excite it in the region of the umbilicus, either of an itching or spasmodic kind, resembling colic. The Oxyures *vermiculares*, or small thread worms, cause an intolerable itching about the anus, and a similar irritation of the nose and mouth, inducing a constant picking of the nostrils and mouth. When, also, there exists a feeling of great nausea and sinking at the stomach, the existence of these worms may be suspected, particularly if accompanied by irritation of the rectum. The tæniæ cause much greater distress than either of the others. The same voracious appetite occurs, as in the lumbricoid variety; but there is a sensation of much greater weight and movement in the abdomen, with a pricking and gnawing of the stomach.

Worms are by no means so dangerous as was formerly believed; the danger arises altogether from the violence of the sympathetic affections; and convulsions, and inflammation of the brain, are the affections most to be apprehended from the irritation of these animals. At other times they exist without even causing any symptoms of their presence, which has induced the belief in the minds of some, that they are actually beneficial, by consuming the excess of nutriment, and thus prevent plethora. There can be no question, that the condition of the system which predisposes to worms is also productive of other diseases; and the derangements, and even fatal consequences, which have at times followed the presence of worms, may be referred to the general disorder of the chylopoetic viscera, which gradually undermines the constitution, and which has too often been attributed to the presence of these animals: one of the symptoms of the effects of this deranged condition of the organs, so essential to the healthy performance of the functions of the system. This we see to be the case in persons sick with disorders affecting the digestion; and in those of a delicate frame of body, which has been inherited from parents, in such as are affected with a scrofulous disposition, etc.; all suffer more or less from derangements of the assimilating function, and are those most commonly affected with worms. In fevers, especially in viriola, scarlatina, and measles, worms often abound in great numbers, and would therefore appear to arise from the condition of the system in these diseases; for it will not be supposed that the diseases are caused by the worms.

In violent fevers, worms have been observed to creep out of the mouth and anus. This is regarded as an unfavorable symptom. The contrary opinion is entertained by Hippocrates, and ancient authors generally, probably from considering worms as more frequently the cause of diseases than they are, and that their removal, either spontaneously or otherwise, is necessary for the cure of the disease. They have often been noticed to make their appearance, on the approach of death, on the outside of the body, a strong presumptive proof of their occupying the intestines as their natural habitation, and that their instinct leads them to forsake the animal which will no longer afford them support.

None of the worms which infest the human intestines can be regarded as dangerous in themselves, excepting, perhaps, the tæniæ. These often create a great and continued distress and irritation in the system; and the extreme difficulty of their expulsion, and the powerful remedies often required for this purpose, will at times endanger the life of the patient. Even after they have been removed, such is the violence of their irritation, that the distressing symptoms will continue for some days, from the habit which the intestines have acquired of putting on a morbid action. All the symptoms above enumerated more frequently attend this kind of the entozoa than the others, and are sometimes greatly aggravated by the powerful measures taken to rid the patient of their cause. Convalescents, it has been observed, recover very slowly after fever, when affected with tæniæ.*

It has been asserted by some that worms have at times penetrated the intestines, and found their way into the cavity of the abdomen and other parts, and even exterior to the body. Hunerwolf gives an account of a case of enteritis where the worms had produced perforations; Heister and Coith, also, relate instances of perforated intestines and worms in the cavity of the abdomen.† There are other instances on record of worms being found both within and outside of the body; but they have been in every instance connected either, with an abscess or an ulcerative process. It is scarcely probable that it should occur in any other manner, for it appears so contrary to the nature of parasitic animals to migrate in this manner.

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* Frank, p. 268. † Dunglison, Op. Cit., p. 42.

TREATMENT.—As the predisposing causes of worms are such as affect the powers of the digestive organs, it will be necessary to adopt such general measures, during the continuance of the disease, as will restore these organs to their healthy vigor. Whatever, therefore, appears, from the peculiar condition of the child, to be the principal cause of this want of tone in the system, must receive our chief attention, otherwise the attempts to cure the disease by the ordinary remedies for destroying and expelling the worms, will be of little avail; and, in some instances, will even be injurious, by their powerful effects on the mucous membrane, rendering the powers of digestion more feeble than before. It is unnecessary to enter minutely into the details of this course; it will suffice that a good substantial diet be adopted, when insufficient nourishment has been the cause; or a change of air, where the circumstances in which the child has been placed, have rendered it probable that a want of free air may have produced a debilitated state of the system. At other times, tonics will be indicated to restore the digestive function to its proper tone.

The remedies which are used to expel worms from the intestinal canal, are prodigious in number. Besides that of an indirect nature, such as are mentioned above, for the purpose of restoring energy to the lost digestive powers, there are many which act in a direct way, and destroy the worms, either by expelling or by killing them by such means as are poisonous or by such as act mechanically. Anthelmintics may therefore be divided into these three classes. A vast number of experiments have been made, to ascertain the effects of various agents on these animals, after they have been discharged alive from the body, for the purpose of ascertaining the medicinal substance which would destroy them the soonest. They have been placed in cold and hot water, in infusion of aloes, in solutions of muriate of soda, oxymuriate of mercury, and other salts. They have also been immersed in brandy, wine, and alcohol. They have also been placed in various essential oils, which it is unnecessary here to enumerate; also in expressed oils, under the supposition that, like other vermicular animals, the spiraculæ would thereby be obstructed, and the animals killed. We have seen, however, that there exist no respiratory organs in the parasitic worms infesting the bowels, and, as might be expected, they lived as long in these oils as in any other fluid.

From all these experiments, very little if any satisfactory results have been obtained; for the accounts are exceedingly contradictory, and in some instances quite unexpected, as was the case in one instance related by Rosen Von Rosenstein, where a worm that was discharged from a child was kept alive a whole day in alcohol.*

The most practical manner of treating the subject, is unquestionably that wherein each species of intestinal worms is separately brought into consideration; for although almost all the ordinary anthelmintics, are applicable to every kind of worm, yet each requires some modification of treatment, arising both from the nature of the worm, and the particular part of the intestinal canal it inhabits.

The worm most commonly met with is the Ascaris *lumbricoides*, and it naturally demands our attention first. The first step in the treatment of these worms, is to administer a purgative of an active nature, as a combination of calomel and jalap, when the condition of the alimentary canal does not forbid the employment of so active an agent. If there exist any appearance of inflammation in the intestinal tube, such a course must be avoided, and one of a milder nature substituted, as castor oil. The brisk action of a cathartic will often remove a quantity of slimy matter which adheres to the worms, and in which they live, and prepare them to be acted on by such direct means as it may be necessary to use for their destruction. Formerly, calomel was very much in use as a vermifuge, but it is doubtful whether it possesses any power, other than its active effect as a cathartic; but in this mode, calomel, as well as other active purgatives, often at once removes many of the lumbricoides.

The operation of calomel, or of any other purgative, should be thorough and effectual at once; it will then remove a large quantity of mucus, in which the worms are lodged. Where there is much mucus present, it is often difficult to procure a good cathartic effect from calomel, even when combined with jalap or rhubarb to quicken its operation. Scammony has been found useful when this state of the bowels exists, in combination with calomel and sulphate of potash, which modifies the griping qualities of scammony, and forms an admirable cathartic in worms.†

After the operation of the cathartic, which should not be often repeated, on account of the debilitating effects on the intestinal tubes, it will be necessary to resort to anthelmintics, if the cathartics fail in expelling the worms. Of these there is a great variety, almost too numerous to record at length, and many of them, probably, are wholly inefficacious.

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* On the Diseases of Children. Translation by Sparmann, p. 230.

† ℞ Hydr. Subm., gr. v.
Pulv. Scammon.,
Potassæ Sulphat., āā. gr. x.
Sacchar. Alb. Pulv., gr. v.
Ol. Cinnam., gt. j. M.
ft. Pulv. No. vi.
One every four hours, to a child three years old, till an effect is produced.

The oil extracted from the seeds of the Chenopodium *anthelminticum* is an anthelmintic in common use, and is certainly very efficacious; but from its strongly stimulating properties is rather hazardous, by exciting inflammation of the mucous membrane.

The same remarks apply also to tansy, Tanacetum *vulgare.* The subjoined formula is the celebrated anthelmintic electuary of Bremser.[*] At the same time an enema of similar ingredients should also be used.[†] It has also been applied externally, in the form of a poultice, made with camomile flowers boiled in milk.

Common salt is a tonic in small doses, and acts as a cathartic in larger; it has been used as an anthelmintic, in the dose of a spoonful every morning. It seems particularly to annoy every species of worms, and its use is well known to every farmer, as the best cure and preventive of worms in all kinds of animals. Its ordinary daily use is of great benefit where there are children predisposed to worms, as the best prophylactic that can be employed.

The Indian pink, Spigelia *Marylandica,* is a very powerful anthelmintic, long in use in the United States. Its effects are decidedly narcotic, and in an overdose producing dimness of sight, dilated pupils, and vertigo; even terminating, it is said, in convulsions. These are not apt to occur, however, if the medicine be cautiously used. I have never known but one instance where a patient appeared to suffer from the effects of this remedy, and the unfavorable symptoms soon disappeared on stopping the medicine. It may be regarded as one of the most useful anthelmintics.

Spigelia may be given, either in powder or decoction. Of the former, a child four years old may take fifteen or twenty grains every morning, followed by an active cathartic, after three or four doses have been taken. The decoction is the most eligible form for its administration; and it may be given either mixed with coffee for breakfast, or sweetened and prepared like the usual beverage taken at that meal. It is made by boiling an ounce of the plant in a pint of water down to half a pint; a half an ounce of which may be taken morning and evening, by a child five or six

[*] ℞ Flor. Tanaceti, ℥ss.
Pulv. Rad. Valerian., ʒij.
Pulv. Jalapæ, ℈j.
Potassæ Sulph., ʒij. M.
Oxymel. Scillæ, q. s. ut.
ft. electuarium.
A teaspoonful twice a day.

[†] ℞ Artemesiæ Absynth.,
Rad. Valerianæ, āā. ℥j.
Cort. Aurantii,
Flor. Tanacet., āā. ℥ss. M.
c. m. f. Spec.
Two tablespoonfuls being infused for a night, and strained; the strained liquor mixed with a spoonful of fresh ox gall, to serve for the enemata.

years of age, until the whole is taken; when a purgative of an active kind ought to be given. This is almost invariably followed by an expulsion of the worms.

Spigelia has also been given in the form of a syrup, made by boiling five parts of the plant for an hour, in ten parts of water. When the decoction has stood for twelve hours, it should be strained and sweetened, and evaporated to the consistence of syrup. This syrup is to be taken three or four evenings in succession, in a quantity proportionate to the age of the child, followed by a dose of castor oil.[*]

Spigelia is often advantageously combined with purgatives; and a very popular prescription is a mixture of senna and pink-root. The following prescription is from the Materia Medica of Drs. Wood and Bache.[†] Another excellent one is the combination of pink-root and savine, as in the subjoined prescription.[‡]

It is unnecessary to mention any more of the narcotic class of anthelmintics; those already mentioned will be found in general sufficient for the removal of the Ascaris *lumbricoides*.

If these means, however, should fail, and the condition of the mucous membrane will allow of its use, spirits of turpentine will be very efficient against this kind of worms, as well as all others. It may be given, it is said, with perfect safety, even to the youngest children, as it does not produce so much irritation in the mucous membrane, as we might suppose, from its powerfully irritating effect on the skin. The dose is from half a drachm to two or three drachms, to children three years of age, mixed with milk, or beat up with the yolk of an egg, or, what is better, by combining it with castor oil.

The bristles or pubes of the Dolichos *pruriens* is the best of the mechanical anthelmintics. It produces on the skin a most distressing itching; but no sensation of this nature follows its use when given internally, and the mucous membrane of the intestinal tube does not appear to be in the least affected. It is, at the same time, one of the safest and most effectual remedies for the lumbricoides, which generally appear after a few doses have been administered. The proper dose is from five to ten grains in syrup, followed by a dose of castor oil.

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[*] Journ. de Connaiss. de Méd., January, 1835.

[†] ℞ Spigeliæ, ℥ss.
Sennæ, ʒij.
Mannæ, ℥j.
Fœniculi, ʒij.
Aquæ Bull., ℥j. M.

Mascera per horam in vase leviter clauso et cola. A wineglassful to be given to a child from two to four years old.

[‡] ℞ Rad. Spigel. Maryland., ʒvi.
Fol. Sennæ, ʒij.
Fol. Sabinæ, ʒss.
Aquæ Bull., ℥iv. M.

Preparation and dose as the preceding.

Grained tin was formerly supposed to owe its efficacy to the presence of arsenic in a metallic state; but it has been satisfactorily ascertained that pure tin itself possesses all the anthelmintic properties. It has also been supposed to act by the hydrogen it generates in the bowels, and that its efficacy is increased by its mixture with sulphur, by which sulphurated hydrogen is formed. By others, its action is considered as purely mechanical, both annoying the worms, and exciting the peristaltic action of the intestines. It is usually given in doses of one to two drachms, mixed with syrup, three or four days in succession, in the morning, followed by a cathartic.

The principles on which the treatment of worms is founded, are the same in all; but there are some differences in the different varieties which demand an alteration, which will make the remedies more particularly applicable to one class. Thus, owing to the situation in which the oxyures are found, in the rectum or lower portions of the intestines, the remedies may be often given by enema; that already mentioned will be found highly useful in the removal of these worms when they are situated at the lower extremity of the intestinal tube. Enemata of sulphate of iron, consisting of three or four grains dissolved in four or six ounces of water, or of equal parts of milk and lime water, or salt and water, or camphorated oil, are all very useful in removing these worms from the rectum. Infusions of valerian and garlic have also been used, for the same purpose. At the same time it will be advisable to administer an aloetic purgative by the mouth; and the aloetic mixture of Evanson and Maunsell is probably the best for administration to children, as the liquorice tends to conceal the taste.[*] The anthelmintic properties of this mixture are greatly increased by the addition of half a drachm to two drachms of muriated tincture of iron. The operation of aloes is principally on the lower intestines, as it is believed to pass unchanged through the small intestines, probably from the difficulty of its solution; it is, therefore, particularly useful in promoting an action in the rectum, where these worms are principally confined, while its action from above will also tend to prevent these worms from moving from their usual habitation, and occupying, as they sometimes do, higher parts of the intestinal tube. Any of these enemata should be daily used, and a purgative once or twice a week will, for the most part, be sufficient

[*] Decocti Aloës Comp., ℥jss.
Extr. Glycyr. ʒij.
Vini Aloët., ʒij. M.
One or two drachms twice or thrice a day.

to remove them; while a generous course of diet, and the habitual use of tonic medicines, where the state of the digestive organs seems to demand their use, will be necessary to secure the system against a return of them. The muriated tincture of iron is an excellent tonic for strengthening the mucous coats of the intestines and stomach and preventing the reproductions of the oxyures. It may be given in the dose of two to ten drops, largely diluted with water, or in the following prescription.[*]

The tæniæ are rare in children; they require much the same course of treatment as the Ascaris *lumbricoides*, except that the difficulty of their removal demands often a constant recourse to the different anthelmintics. The prescription of Bremser, already mentioned, is one which, when followed by an active cathartive, and the immediate use of the empyreumatic oil of Chabert, is remarkably successful, according to this celebrated German practitioner, as well as by Frank.[†] The empyreumatic oil differs but little from the oil of turpentine in its effects, and consists of one part of the empyreumatic oil of hartshorn and three of the oil of turpentine; the dose for an adult is two dessert-spoonfuls morning and evening.

The celebrated remedy which was revived by Mad. Nouffleur, the male fern, Polypodium *filix mas.*, was in use in the days of Galen and Dioscorides, as a remedy for tape-worm. From the testimony of numbers of physicians in every country, it has been successful when every other remedy has failed. An instance of this kind occurred in the case of the late Dr. Jones, of this city; all the varieties of anthelmintics had been used without effect, until recourse was had to a decoction of fern, when a worm measuring forty-five feet came away.

GASTRITIS.

Inflammation of the stomach is described, by the French writers, as a disease by no means unfrequent among children. It is to MM. Saillant and Billard that we are indebted for the information we possess in relation to this disease, as it occurs in young children. The last-mentioned author particularly records all that is known as to the pathology of the disease. Dr. Burns,[‡] also, has a few practical remarks on this disease, which he observes is not common in infancy, nor is it discovered without much attention.

Etiology.—This disease is at times of congenital origin, the researches of Billard furnishing us with instances in which the fœtus was evidently affected with it. It is unnecessary here to give the cases in detail; the reader is referred to the work of M. Billard for the accounts of these interesting cases.

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[*] ℞ Tinct. Ferri. Muriat., gt. x.
Aquæ Cinnam., ʒjss.
Syrup. Simpl., ℥j. M
Two teaspoonfuls every hour.

[†] Op. Cit., p. 290.

[‡] Principles of Medicine, including the Diseases of Women and Children, by John Burns, M. D., American edition, p. 727.

When it arises in infants after birth, its causes do not differ from those occurring in adults. The irritation of irritating ingesta, or of poisonous articles taken into the stomach, sometimes occurring accidentally, from the solution of a metallic oxide from the vessel in which the food has been prepared. Cold or wet applied to the surface of the body, also, will produce it, as in adults.

Morbid Anatomy.—The stomach is found inflamed in different parts of its structure, from which the disease has been arranged in different forms: that affecting the capillary vessels of the stomach, causing a ramiform capillary injection, or appearing in patches or striæ in the mucous membrane, or in the papillæ and villosities, has been distinguished by the name of erythematic gastritis. Another form is that in which the secretion of the stomach is principally affected, corresponding with the altered secretion of the mucous membrane of the mouth, and known, when it occurs in that part, as the thrush, or muguet of French authors. When these symptoms occur after the mouth has been affected with aphthæ, there can be no question that the inflammation has extended to the stomach. The third form of gastritis is that affecting the follicular apparatus of the stomach, sometimes appearing under the form of small, white, round, slightly projecting granulations, with a black point at their summit; at other times inflaming and ulcerating. The fourth variety is that denominated gangrene of the stomach, and consists of a true disorganization of its tissue. This last is rare in infants, but it has been found where the mucous membrane had become of a deep brown, and partially in a state of putrefaction, and diffusing an offensive odor. The shreds of the separated membrane were diffused in a dark colored fluid. Another variety of gastric inflammation is the gelatinous softening, as is described by M. Cruveilhier. The mucous membrane in this variety is found pale and colorless, and almost transparent, as if macerated in water and reduced to a pulp, while the mucous follicles are in their natural state. This alteration of the tissue of the stomach is most evident at the greater curvature.

These are the different results of inflammation of the stomach, condensed from the accounts furnished by MM. Cruveilhier and Billard, and they all arise from inflammation, varying in violence and seat, and modified by the constitutional vigor of the patient. All these varieties, although described as distinct, may yet occur together, and Billard has given a case in which such an assemblage of morbid phenomena was formed; proving them to be the result of inflammation, varying from the causes above mentioned.

SEMEIOLOGY.—The characteristic signs of gastritis are pain on pressure over the stomach, evident from the child shrieking or crying. The bowels are usually loose. If the child be old enough, he will describe the pain as of a burning character. In addition to these symptoms there is constant vomiting. There are often a continual coughing and difficulty of respiration, but the disease may be distinguished from pulmonary inflammation by the absence of vomiting in the latter. The expression of countenance is remarkably altered in gastritis.

There is but little or no difference in the symptoms of the different forms of the disease, except that in the follicular variety there is often bloody vomiting. In that, also, which is known as the gelatinous softening, the symptoms are remarkable for their severity. The skin is cold, the pulse irregular; the face is much wrinkled, and expresses great pain, while at the same time there is great prostration and insensibility, occasionally alternating with severe pain.

TREATMENT.—The first indication in the treatment of gastritis, is to allay the violence of the inflammation, by the abstraction of blood, if the strength of the patient can bear the evacuation. It will rarely, however, be necessary to adopt general blood-letting in young children, in whom the prostration is often very great. In those that are older, where there is much tension of the pulse, the lancet is our main dependance. Leeches may in general, however, be safely applied on the epigastrium, followed by warm stupes. These, or cataplasms throughout the disease, are admirable means of lessening the inflammation, and should be constantly used. When the action of the blood-vessels is subdued, a blister may be applied over the affected part.

Purgatives should be carefully avoided; and if it become necessary to relieve the bowels, it should be done by means of laxative enemata; even the mildest and least irritating laxative ought to be withheld from the stomach, much more those nauseating remedies, so useful in inflammations in general. Mucilages may be freely used, and the thirst satisfied with iced drinks.

In chronic cases it has been recommended to use frictions with tartar emetic ointment; but this can not be employed without hazard, from the effect that antimony almost invariably exerts on the stomach, especially in debilitated or young subjects. Revulsion may, however, be made by stimulating baths, and the application of sinapisms or blisters to the lower extremities.

ENTERITIS.

Inflammation of the intestines is of common occurrence in infancy, and in some instances assumes so great a difference in its symptoms, as to be one of the most difficult diseases at times to recognise. This arises from its occurring in every degree of intensity, and affecting so many different portions of the intestinal tube, whereby its sympathetic irritations vary in almost every instance. But these will be more particularly noted under the semeiology of the disease, and especially the remarkable difference between this disease in adults and youth, and as it occurs during the period of infancy.

For the remarkable facts connected with this affection, we are indebted to Dr. Abercrombie,* and to those indefatigable French physicians, MM. Billard† and Valleix,‡ who have so ably investigated this interesting subject in the hospitals in Paris.

Etiology.—This disease, like the preceding, has been found in children so shortly after birth, as to leave no doubt of its congenital origin, it having existed both in an acute and chronic state; and the extreme feebleness of some infants, no doubt, arises from inflammation of the first passages which has existed before birth; for in some, in which there existed no other symptoms than excessive feebleness, extensive inflammation of the intestines has been found, and was the only abnormal condition existing.

The high state of excitability in the mucous membrane of sucking infants, together with the activity of the digestive function, renders it extremely liable to inflammation. Irregularities of diet, also, an error so frequently committed, is one of the most common causes of inflammation of the bowels. The pernicious practice of administering purgative medicines on the slightest disorder of the child, is another very evident cause of inflammation in these parts. It is, therefore, of the greatest importance that this habit be not early acquired; many a child has been sacrificed to the pernicious custom of using a cathartic immediately after birth, which not only is itself productive of direct injury, but by rendering the bowels disposed to inaction without the repetition of this stimulant, increases the necessity of cathartic medicines.

Semeiology.—The symptoms of enteritis in young infants differ greatly from those occurring in adults. In the latter, the abdominal region is the part mostly affected the symptoms varying with the portion of the tube which is diseased. The progress of the disease is also much more rapid in the adult; there are fewer complications, and the prognosis is much more favorable. In the newborn child there is but little febrile action; the progress of the disease is slow, and death almost certain, and the secondary symptoms often very numerous and variable; although in some few there exists a want of these symptoms of complication, which occurs more especially where the disease is of congenital origin. In children, however, where there is much febrile excitement manifest, other and distant parts often are the only parts which manifest any disturbance; and, while in the adult the local tenderness is the most marked symptom, in infants there exist many marks of irritation in the pulmonary and cerebral systems; so that there have existed severe signs of pulmonary inflammation, as would appear from the rapid and laborious breathing, while the physical signs gave satisfactory indications of the non-existence of disease in the thorax. Such cases must have been seen by almost every practitioner of any observation, and where the remedies applied for the relief of pulmonary disease have been unattended with any satisfactory result. Again, symptoms of cerebral irritation are very common in children affected with enteritis. After the severest symptoms of inflammation of the brain, dissection has at times exhibited no remains of disease in the head, while severe inflammation has been found in the abdominal viscera. Such, however, is the intimate sympathetic relation between the mucous membrane of the digestive passages and the brain, that in the treatment of the diseases of children this relation should constantly be borne in mind; for serious diseases of the brain are often the result of inflammatory action in the digestive organs; a fact well known to the ancients, but more particularly pointed out by modern writers. The pathological sympathies are so great, that, according to some investigators, the meninges of the brain participate in an equal degree with the affection of the mucous membrane of the bowels, having at one time a chronic action, and at another an acute character, according to the amount and degree of the primitive disease. Laborious and varied researches have been made on living animals, on animals that have been suddenly killed, and on men that have met with a violent death, for the purpose of ascertaining the natural condition, if possible, of the meninges of the brain, before coming to this conclusion.*

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* Op. Cit., p. 46.

† Op. Cit., p. 296, et. seq.

‡ Op. Cit., p. 462, et seq.

With every allowance for the enthusiasm of those devotees of science, in regarding the cerebral meninges as affected with precisely the same shades of diseases as are found to exist in the mucous coat of the intestinal canal, no doubt can remain of the intimate relations between them, and of the danger arising to the brain from the existence of abdominal disease; for the part at first only sympathetically irritated, may at last absorb the whole of the disease; or, what is of more common occurrence, exist in connexion with the original visceral affection.

The most common symptoms of this disease are vomiting, diarrhœa, tympanitis, and abdominal pain, which is increased on pressure. Fever is often absent, but there is great heat on the abdomen; this is so constant a symptom, that the physician should always examine the abdomen and the surrounding parts, to ascertain the existence of morbid heat in the part. The heat, for the most part, is greater in proportion to the violence of the inflammation, although it exhibits exacerbations and remissions. As a general rule, the inflammation is at its height when the heat is the greatest, while at the same time there is violent thirst, dry skin, and cold extremities. The thirst is greatest in proportion to the extension of the inflammation toward the duodenum, according to the opinion of M. Broussais.

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* See a paper by M. Scoutettin, in the twenty-eighth volume of the Jour. des Sciences Médicales. Also, Researches d'Anatom. et Patholog., etc. etc., sur le Cerveau, par J. Sabrioles, *passim.*; Paris, 1826.

In the early stages of the disease, it is difficult to distinguish it from ordinary bowel complaints. As it advances, the tongue becomes furred and dry; there is great restlessness and wakefulness. In the first appearance of the inflammation, the bowels are loose, but toward its close the evacuations are but seldom made; and when alvine discharges occur, they are often attended with great pain and force. The color of the evacuations has been usually described by French physicians as green. But their color varies; sometimes it is brown, reddish, or clay-colored; influenced considerably by the color of the food that is taken, which also imparts its consistency to it. No digestion taking place, the feces retain the appearance of the food when first taken into the stomach. From its resemblance to ordinary diarrhœa, at its first appearance it often excites little or no alarm, until sympathetic disturbance, or general constitutional symptoms arise. As the disease advances, the skin becomes cold and wrinkled; the face, particularly, shows the effect of the suffering the child experiences, and has a wrinkled and corrugated appearance, like that of an old person. The debility at this period is extreme, sometimes coming on with remarkable suddenness; at other times the disease terminates in a profound stupor.

No better summary of the symptoms, for the purpose of diagnosis, can be made, than that furnished by an analysis of eighty cases of enteritis, seen during life, and anatomically examined, by M. Billard. From these it appears that tympanitis, vomiting, and diarrhœa, are the most prominent signs of inflammation of the mucous membrane of the small intestines. Inflammation of the large intestines, which he denominates colitis, is for the most part without vomiting or swelling of the bowels, but always attended with diarrhœa. This is what is usually termed dysentery; and as it requires some considerable modification of treatment, will be the subject of separate remarks. The absence also of febrile excitement is very common in this disease, in young infants, and on this account we should not wait for the manifestation of any inordinate excitement of the blood-vessels, before we are led to suspect the existence of severe inflammation of the bowels; for a fatal inflammation may occur without any manifestation of it by the pulse. It is also of some importance to be able to distinguish inflammation from simple functional derangement; in this there are often severe vomiting and purging, which may be arrested without hazard to the child. This condition may generally be ascertained by the absence of pain on pressure, and the tenseness of the abdomen, which occur more or less in every case of enteritis. The absence of heat will also distinguish the existence of functional derangement.

Another diagnostic sign is in lineaments of the face; first pointed out by M. Jadelot, and contained in M. de Salle's edition of Underwood.* These are described by him as occurring more particularly in children advanced beyond the period of infancy. One of the most certain marks of abdominal affections, according to M. Jadelot, is first the genal lineament, which extends from the commissure of the lips to the lower part of the face, where it loses itself; the second, the nasal lineament, extending from the inside of the alæ of the nose, and surrounds the whole of the orbicularis oris muscle. These, as was before remarked, are not always to be seen in very young infants, yet some trait of them may be observed, as a fold in the commissure of the lips, or outside of the orbicular muscle, corresponding with the nasal lineament. When the child suffers violent pain, there is a corrugation of the skin of the forehead; and, indeed, the sudden appearance of wrinkles in any part of the face almost always indicates the presence of abdominal pain, and demands the attention of the physician, for they are invariably marks of distress not to be overlooked. A pinched expression of face, without the presence of any particular lineament, in very young infants, is always a sign of gastro-intestinal inflammation. All these inflammatory affections of the bowels may become chronic; the thirst then is very great, the tongue much furred, and the appetite is much impaired, or is entirely lost; the abdomen remains distended, while the rest of the body is much emaciated. The surface of the body is remarkably dry, and becomes of a dirty ash color. The fever is remittent, and not violent in its character.

Morbid Anatomy.—Dissections have shown, in some instances, simple capilliform injections throughout the intestinal canal; in others there existed patches of redness, of greater or less extent, with tumefaction of the digestive tube, and friability of the mucous membrane. Blood has also been found effused in different portions of the intestines where there existed violent inflammation; when this is the case, it is usual for it to appear in the stools during life. In more advanced stages, there are found patches or striæ of a brown or slate color, in the mucous membrane, indicating a chronic phlegmasia of the membrane.

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* Traité des Mal. des Enfants de M. Underwood, etc., p. 36.

There has also been seen the altered condition of the secretion known as muguet, the disease which, when situated in the buccal mucous membrane, is called milk thrush. It has been described as a peculiar form of intestinal inflammation by some, while others maintain that muguet is in every instance essential to the disease.

The muciparous follicles, the glands occupying the upper portion of the small intestines generally, and isolated in the cœcum and colon, sometimes become the seat of various alterations from inflammation. Sometimes they are red and tumefied, at other times disorganized and ulcerated, giving to the ulcers in the intestines a peculiar appearance.

The mucous membrane has also been seen in a state of disorganization and softening, a condition entirely different from the white softening occurring in the same membrane during simple indigestion. This inflammatory softening arises where the mucous membrane has been long the seat of inflammation; it at last becomes so altered in its structure as to retain few, if any, of its membranous characters, but is, on the contrary, a soft red mass.

Some circumscribed spots of the mucous membrane have been found sphacelated, more particularly about the ileo-cœcal region. Eschars and adhesions, also, are very common in different portions of the intestines; these generally arise after very violent inflammation.

Such is the analysis of the various facts obtained from different sources. From these the French pathologists make four varieties of enteritis, designating them as erythematic, follicular, with altered secretion, and with disorganization of tissue. Inasmuch, however, as there is great difficulty, if not impossibility, in distinguishing them during life by any marked symptom, the distinction can not be of much practical value in treating the disease. The violence of the symptoms may lead us to expect the termination of inflammation in the worst form, or disorganization of tissue, and to proportion the activity of the treatment accordingly, or to make a prognosis of the case; which, under these circumstances, must be unfavorable.

All these varieties may occur simultaneously, and it appears to be a useless distinction to describe them as separate forms. In all an altered state of the secretion occurs, so that the form of muguet may be found more or less in every case. Indeed, so common is this state of the mucous membrane, that M. Valleix* is of opinion, that inflammation very rarely exists without the presence of muguet; for of forty-six cases there were but three which appeared to present enteritis without muguet, on the simple uncomplicated erythematic enteritis.

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* Op. Cit., p. 487.

TREATMENT.—As in the disease just considered, it requires some judgment as to the abstraction of blood—a course by no means called for in every case of inflammation of the stomach or bowels. Indeed, the prostration is at times so great as to render the application of even a few leeches extremely hazardous; and, in these affections, to cause their interdiction almost entirely in the Foundling Hospital at Paris. The cases found there are those of great debility, and are by no means guides for us, as I have repeatedly experienced. Still there is, perhaps, no inflammatory disease of infancy in which there exists so much prostration as in those affecting the stomach and bowels. In children, however, somewhat advanced, when there is every evidence of acute inflammation, the use of leeches can by no means be dispensed with. But even in these cases the flow of blood should be carefully watched, as excessive prostration may ensue from the loss even of a moderate quantity of blood. In two instances I have met with a very serious prostration, and nearly fatal from this cause; so that whenever there is a necessity of applying leeches to the epigastrium in children, I am particularly cautious not to allow the blood to flow until exhaustion is produced. Drs. Evanson and Maunsell advise a repetition of leeching, as preferable to allowing any continued loss of blood, which may greatly reduce the strength of the child without arresting the disease, and very judiciously advise the physician himself to superintend the flow of blood, that it may be arrested when necessary.

Fomentations, warm baths, and blisters, are powerful means of combating enteritis. Counter irritation in some form should never be omitted. Fomentation ought to be substituted for the warm bath where the debility is great. So, also, in general, sinapisms may with safety be used in extreme debility; they, as well as blisters, ought to be applied to the extremities. Sinapisms ought not to be kept long applied; as soon as a little redness and smarting are produced, they ought to be removed and re-applied, if necessary. Opium, in the form of Dover's powder, is a highly useful medicine in the treatment of enteritis, and should be used where the irritability of the stomach does not forbid its use. When this condition of the stomach exists, opium, as heretofore directed at page 196, will be found of great efficacy in allaying the extreme irritability of the bowels, and producing an action on the skin. Opium is of admirable benefit in inflammatory complaints of children, especially after bleeding, and was much in use by the older

American practitioners. A reference to this subject has already been made in the article on pneumonia.

It is not safe to have recourse to much internal remedies of any kind in this disease, except the opiates above mentioned, with gum syrup, or some other mild mucilaginous substance, taken cold. The child, if at the breast, should not, as is the custom in some foreign hospitals, be taken from the breast; but if the milk be thought too irritating, it may be pressed from the breast and mixed with water before it is given to the child. M. Valleix, from the complete inefficiency of the means employed in the treatment of some cases reported by him, which consisted chiefly of mucilages and feculent nourishment, is of opinion that a greater change of measures than is usually pursued, is clearly necessary for the successful treatment of enteritis; and refers to the measures adopted in the treatment of the affection in adults, as an evidence of the more successful method of managing the disease, observing that opiates are freely used in the latter, while a much greater change is made in their regimen. In children, on the contrary, but little change is made, and feculent substances are given in very large quantities, so that they are in fact kept suffering the whole time from indigestion.

It appears to have been a very common practice in the Foundling Hospital at Paris, to give gummed rice, or a thickened preparation of the same article, known by the name of "crême de riz," or salep, and other thick, feculent matter, for food to children, without making much if any change in these diseases. M. Guillot has made it appear, by some very simple experiments, that young infants digest with great difficulty these feculent articles of food. In twelve children that died of different diseases, the feces found in the small and great intestines were subjected to the influence of the tincture of iodine, and a very intense blue color was the result; from which there could exist no doubt that a great portion of the fecula had passed through the whole of the intestinal canal without undergoing any change.* These are important facts, and in some respects account for the great mortality in the Hôpital des Enfants Trouvés, for they must constantly suffer from indigestion, and when affected with gastritis or enteritis, be exposed to the continued irritation of unassimilable food.

The bowels may be kept open by the means of enemata, composed simply of warm water, or castor oil mixed with an infusion of flax-seed. As costiveness is a very distressing and irritating condition of the bowels, it should be removed, and, if possible, by means of enemata. Tepid milk has been used as an enema in costiveness, and is a very efficient laxative. In no case should active purgatives be given; but the most decided advantage will at times arise, in protracted cases, from the use of a few grains of calomel and Dover's powder, followed by a little castor oil. Castor oil has been objected to as a cathartic in irritations and inflammations of the bowels, from its being too irritating. These are contrary to my experience, and it has always appeared to me a mild cathartic, operating promptly and with little or no griping, the alvine secretions being but little affected, while the contents of the bowels are freely evacuated. It is therefore particularly applicable to inflammatory diseases of the bowels, when it becomes necessary to procure evacuations from the bowels, which can not be effected by means of enemata. A very good combination is an emulsion containing mucilage.[*] For further details of the treatment, when diarrhœa is the most common symptom, the reader is referred to the article on that subject. When the disease becomes decidedly chronic, the mesenteric glands are likely to be affected and become indurated. Here it will be necessary to use more freely the hydrargyrum cum cretâ, and to rub the bowels with the ointment of iodine or hydriodate of potash. The article on the mesenteric disease contains the details of the treatment which it will be necessary to pursue when these glands become enlarged.

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* Valleix, Op. Cit., 489.

In protracted and chronic cases, it will sometimes be necessary to allay the irritable condition of the bowels, at other times to arrest the too copious discharges, and in some cases to support the strength of the patient, by the use of tonics and bitters. All these varieties of treatment must depend on the judgment of the physician. The circumstances under which they are applicable, are considered more at length under the article on diarrhœa, to which the reader is referred.

DYSENTERY.

Although this variety of intestinal inflammation offers but little if any dissimilarity in its appearance from that which it exhibits in the adult, and therefore scarcely to be regarded as a disease of childhood, yet, inasmuch as it is a very common affection of children in summer, and the symptoms exhibit some peculiarities distinct from inflammation in other parts of the intestinal tube, and as some difference of treatment is required, arising principally from the seat of the affection, it will be briefly considered with reference to its peculiarities.

From the seat of the inflammation in the large intestines, it has of late been denominated colitis, as distinct from the inflammation seated in other parts of the intestines, which has received the name of ileitis. Both these diseases may exist together, and severe gastritis may be also connected with them; but nothing is more common than to see pure and uncomplicated dysentery existing in childhood and infancy, entirely unconnected with inflammation in other parts of the intestinal tube.

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[*] ℞ Ol. Ricini, ʒiij.—vi.
Pulv. Acaciæ, q. s.
Syrup. Simpl., ʒijss. M.
ft. Emulsio.
A dessert-spoonful every hour, until it operates.

ETIOLOGY.—As this form of enteritis is more prevalent during the latter part of the summer and autumn, the sudden changes from extreme heat to the cold and damp of the night are unquestionably its most frequent causes. All the causes, also, which are the active agents in the production of other forms of inflammation in the mucous membrane of the intestinal tube, such as irritating and indigestible food, will be productive of this.

Malaria, also, is unquestionably a very efficient agent in the development of dysentery; it is accordingly found to prevail as an epidemic in situations favorable to the existence of intermittent and remittent fevers, and it often exists simultaneously with them, or is observed to follow such affections. The remarkable connexion of these diseases was long since observed by Sydenham; and it is without question attributable to the influence of this agent on the liver and portal circulation, which are considered more at length in other parts of this work.

SEMEIOLOGY.—Dysentery usually commences with diarrhœa; the discharges at first being feculent and afterward watery, with slight admixture of blood. They gradually change to mucus, in which there is more or less blood. There is but little fixed pain, but at times, immediately before a stool, a violent and very distressing tenesmus occurs. This is the ordinary character of the evacuations throughout the disease, with the occasional appearance of true feculent matter in the stools. When the disease is uncomplicated with inflammation in other parts of the mucous membrane, the regular and periodical evacuation of healthy feces will often take place, while the mucous and bloody discharges are continued during the intermediate periods.

Fever, for the most part, attends this disease, although it is often but slight, and the pulse is a little quickened, although not much, if in any degree, increased in force.

In very severe cases the fever is high and the tongue furred, while the local symptoms, tenesmus and mucous stools, are very frequent; the bowels continue costive, the alvine evacuations being occasionally mixed with scybala. As the disease advances the anus becomes excessively painful and hot, and if relief be not afforded, great prostration of strength ensues, the pulse is feeble and the skin is cold; distress and pain are experienced throughout the intestines;

nausea and vomiting supervene, and aphthæ appear in the mouth. As in most abdominal diseases of children, coma and cerebral effusion are the most ordinary symptoms at the close.

Dysentery is one of the most obstinate of all the diseases we have to encounter, and the favorable symptoms are often extremely fallacious, a chronic affection of the mucous membrane frequently following a protracted disease. From chronic dysentery recovery is very rare.

MORBID ANATOMY AND PATHOLOGY.—Marks of inflammation are found in the mucous membrane of the colon and rectum—occasionally in the small intestines. These parts are also covered with shreds of inspissated mucus, or coagulable lymph, the thinner portions having been discharged by stool. Ulcerations also exist in violent cases, while sphacelus is not uncommon under similar circumstances, especially if the case be protracted. In chronic cases there is some difference in the appearance of the mucous membrane, which is often mamillated, looking as if cicatrization were in progress.

Dysentery, therefore, in its early stage, is an inflammation of the mucous coat of the large intestines. This inflammation, spreading to the other coats, causes ulceration, and disorganization of their tissues. At other times, the inflammation is chronic in its nature, more slow in its progress, and less destructive to the parts affected. The division, therefore, of chronic and acute dysentery is well founded, and is of daily occurrence.

TREATMENT.—The remarks as to the necessity of early bloodletting already given, when treating of gastritis and enteritis, are applicable to the disease now under consideration, with this exception, that it may, in general, be more freely used than in inflammations of other portions of the digestive tube; the prostration accompanying the disease not being so great as in either of the other affections. Leeches may be applied, in ileitis, to the anus; but with far greater advantage in this disease. The free abstraction of blood in this manner is of decided advantage; and in those cases where the blood flows freely in a spontaneous manner, I have noticed much less tormina than in those cases where the evacuations consist principally of mucus. When leeches are applied to the anus, the bleeding ought especially to be watched, as the hemorrhage may sometimes be excessive, from the extreme vascularity of the part; and great loss of blood, especially from capillary bleeding, has at times been fatal to young children.

In dysentery, children bear the operation of mild purgatives far better than in other forms of enteritis. These, therefore, may occasionally be given, and castor oil, combined with a few drops of tincture of opium, will be the most suitable, from the mildness and efficiency of its operation. As the appending viscera are also simultaneously affected in many instances, and more especially the liver, calomel, in small doses, when combined with Dover's powder, will be the proper means of exciting the biliary secretion, and relieving the congested state of the organ, and thus restore a freedom to the circulation of the abdominal viscera.

Anodyne enemata are extremely useful in all degrees of tenesmus accompanying dysentery, but great caution should be observed in the quantity of laudanum used in the enema. The rule in the adult is to give treble the quantity which would be administered by the mouth. In very young children, it is not uncommon to see complete stupor produced by the same quantity given by the anus which it is usual to administer by the mouth. It should therefore be cautiously given. Children appear to be peculiarly susceptible to the action of opium; and although a most decided advantage often follows the use of it in the peculiarly irritable condition of the system at this period of life, yet from the great rapidity of absorption, the smallest quantity can not be given without some hazard. Four drops of laudanum has killed a child a month old; and in another, three drops given to a child of fourteen months, was followed by coma, convulsions, and death, in six hours. Diaphoretics may be more freely given in this than in the other forms of intestinal inflammation; and in robust children, advanced beyond the period of infancy, antimony will be admissible when the febrile action is high. But Dover's powder, from the peculiar action of its different ingredients, is admirably adapted to the treatment of dysentery.

The disease often becomes exceedingly protracted, bearing some resemblance to severe diarrhœal affections, with great prostration and exhaustion from the excessive mucous and bloody discharges. Astringents have been used in this condition with decided advantage.

Various means of this kind have from time to time been employed, and among them the acetate of lead in the dysentery of adults. This has also been used in cholera infantum, and the kindred diseases of children. For further observation on the use of astringents, the reader is referred to the articles on cholera infantum and diarrhœa. The subjoined vegetable astringents have been more especially used in the protracted form of dysentery of children, and the annexed formula is highly recommended by Dr. Zollickoffer, of Maryland, in the third volume of the New York Medical and Physical Journal.* Dr. Cogswell, of Washington county, New York, when the disease prevailed very extensively among children, relied principally on vegetable astringents for the treatment of the disease in this form. These were composed of the white oak, Quercus *alba,* blackberry root, Rubus *villosus,* and the yarrow, Achillea *millefolium,* combined. They were boiled together in milk, or milk and water, which, when sweetened, was readily taken by children. No particular rule was observed as to the proportion of the ingredients, except that the oak and blackberry predominated. This course is represented to have been very successful in the epidemic dysentery, which prevailed some years ago in Washington county, in this state.†

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* ℞ Euphorbiæ Hyper. Fol. Excit., ℥ss.
Aquæ Bullient., oj.
ft. Inf.
A large spoonful every hour, until the morbid symptoms cease.

With respect to the diet and regimen of children laboring under dysentery, the same rules already laid down for them in other diseases of the bowels are applicable to this disease; and the general principles of the treatment need not differ from that adopted in adults. A more particular detail, therefore, of what relates to the nature and management, is on this account deemed unnecessary in this work.

PERITONITIS.

The peritoneum is more commonly inflamed in young infants than is supposed, and many of the cases of abdominal inflammation which have been referred to the intestines, have doubtless been of their investing membrane; at least such would appear to be the case from the anatomical investigations of MM. Dugès and Billard.

ETIOLOGY.—Children have been born with every symptom of acute peritonitis, and its existence verified after death by the usual examinations. In other instances infants have been born feeble and emaciated, without exhibiting much evidence of disease, and after death, which usually with this affection takes place within a few hours, old*and firm adhesions have been found between different convolutions of the intestines, and in the peritoneal cavity, which have doubtless been formed during intra-uterine existence.

M. Dugès gives a very interesting account of a case of acute peritonitis, which occurred at the Maternité, in a child prematurely born, measuring about sixteen inches in length, and weighing between three and four pounds. It died in three hours after birth. On a post-mortem examination, all the usual appearances present in inflammation of this membrane were found.† . In other instances infants have been born quite vigorous, and died a short time after birth, and the existence of peritonitis for the first time revealed on a post-mortem examination.* It is difficult to account for the origin of these cases of intra-uterine disease, which, from the firm and old adhesions existing, appears to have been of long standing, and to have passed through the various stages while the child was in utero. The mothers appear not to have had any disease of this nature, and, in general, were in perfect health.

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* N. Y. Med. Repos., vol. ii., p. 127.

† Recherches sur les Malad. les plus import, et les moins connues des Enf. Nouveau nés; Paris, 1821.

Peritonitis, like other inflammations, has its origin also in the usual causes of pyrexial diseases, and may attack children at all ages, as they are subject to the numerous exciting causes with which we are surrounded; and irritation and inflammation of their organs are, from the greater susceptibility of their systems, much more liable to inflammatory action.

Infants at the breast are not unfrequently attacked with this disease; but some anatomists have observed, that it appears to have arisen from a constipated condition of the bowels, or from some strangulation or obliteration of a portion of the intestinal tube. It has also been remarked that mothers, suffering from puerperal peritonitis, do not impart it to their offspring.

The disease also may arise as a sequel of others. I once knew a severe and fatal case of peritonitis, which suddenly supervened on the dropsy following scarlet fever, where the general symptoms were of so trifling a nature as scarcely to demand any attention.

SEMEIOLOGY.—In acute peritonitis the disease may be known without difficulty. The symptoms are severe pain in the abdomen, which is increased on the slightest pressure. The extreme tenderness of the inflamed part makes the pressure of the ordinary cloths and bandages, and even the weight of the bed-clothes, insupportable; while the abdomen is greatly distended and tympanitic. The pain and tension are particularly severe around the umbilicus. With these symptoms there is also great restlessness, with crying, and a peculiarly pinched and painful expression of the face. There are also eructations and vomiting, as the disease advances, and a constipated state of the bowels, continuing from the commencement. The pulse is small and frequent, and, indeed, even at the beginning, can scarcely at times be felt.

If there should be any difficulty still in making a diagnosis of the disease from pleurisy with these symptoms, percussion of the thorax will be sufficient to establish it; a dull sound of the thorax being always present in inflammation of the pleura. This may be the more necessary, as dyspnœa is not a pathognomonic symptom of thoracic disease. Chronic peritonitis is much more difficult to ascertain; the symptoms are slight, and easily confounded with those of enteritis, or chronic pleurisy.

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* Billard, Op. Cit. p. 353.

Peritonitis is one of the most fatal diseases of infancy, and its prognosis is decidedly unfavorable.

MORBID ANATOMY.—The usual signs of severe inflammation exist in every portion of the peritoneal cavity, as in the adult. Not only have these been found in that membrane, but all the abdominal viscera have been covered with concrete albuminous matter, by which the convolutions of the intestines were adherent. The surfaces of the liver, bladder, and of all the abdominal and pelvic viscera, have also been coated with albuminous exudation; while sero-membranous layers exist on the mesentery, and sero-purulent fluid is occasionally discovered in the cavity of the abdomen.

TREATMENT.—The general principles of treatment of inflammation are applicable to this form of phlegmasia. The application of leeches to the integuments of the abdomen should be one of the first measures to be adopted, while the bleeding from the bites should be encouraged in the usual mode. The extreme feebleness of the circulation almost renders general blood-letting impossible in infants. In older children it must by no means be neglected; and although the pulse is often so exceedingly small, and the surface of the body so cold as almost to forbid the use of the lancet, yet, as under similar circumstances in adults, the pulse will in general show the effect of the increased circulation from the affected part toward the surface of the body, by an increase of its fulness.

The warm bath is of undoubted efficacy, from the powerful revulsion it creates to the surface; but what particular advantage can be derived from the marshmallow bath, as used in France, is difficult to understand. The application of flaxseed or marshmallows to the abdomen, is of use, from the length of time with which they may be applied, and thus preserving a continued flow of fluids to the capillaries of the integuments. M. Chaussier, as quoted by Dugès, recommends covering the surface of the abdomen with oil of camomile and oil of almonds. It is difficult to comprehend for what purpose such a measure is recommended. Stimulating baths to the lower extremities ought to form a part of the treatment of this affection, and every method employed to preserve an action on the surface of the body, especially in the extremities.

Cathartics may safely be given in peritonitis, although, like most other remedies, often with very little effect on the disease in young infants. Calomel and ipecacuanha, from their effects in exciting copious secretion from the liver and intestinal mucous surface, and thus making a powerful revulsion, are an excellent combination when followed by other active cathartic mixtures, as infusion of senna, castor oil, etc.

Antimony, James's powder, and other diaphoretic articles, may with more safety be administered in this disease than in those affecting the intestinal mucous surface; with the precaution necessary in the use of all such remedies, in cases of young infants, who are very easily, and not unfrequently fatally prostrated by the use of antimonial preparations.

In convalescence, the usual precautions which are necessary in all abdominal inflammations, must be carefully employed in this disease, such as the application of flannel to the surface of the body, and the careful protection of the legs and arms from the cold; for a return of the affection is very likely to ensue on any neglect of these measures.

HERNIÆ.

Children are liable to herniæ from any of the natural openings of the body. Those occurring in the abdomen may arise not only from the natural openings, but also from some imperfection of the abdominal parietes. The latter are very rare, but the former are not unfrequent, and often arise from a natural predisposition, for it is not unusual to see two children of a family thus affected. The most common of these is omphalocele, or umbilical hernia.

Umbilical hernia will therefore form the principal subject of these remarks.

ETIOLOGY AND MORBID ANATOMY.—The cause of this affection must be sought in the natural conformation of the part, and the relative condition of the intestines, of the fœtus and the umbilical opening. In the early period of fœtal existence, almost the whole of the intestines are contained in a sort of pouch at the base of the cord. As the fœtus is developed, and the different parts assume their proper size and relative position, the convolutions of the intestines gradually recede within the abdominal cavity, while the opening which admits the cord closes, until at birth it is just sufficient to admit the umbilical vessels. The base of the cord however, will at times continue still large enough to retain a portion of the intestine, and a species of pouch is thus found to exist, formed by the skin and cellular tissue, and the peritoneum. A portion of the intestines, therefore, instead of returning within the cavity of the body, occupies the natural lodgment thus afforded; and the constant pressure on the mass of the abdominal viscera by the abdominal muscles, assists in continuing them in this situation. The hernial sac for the most part contains a small part of intestine, but there have been found instances in which the liver, spleen, and a great portion of the small and great intestines have been found, as is the case in an instance mentioned by Scarpa.* When these large tumors exist, they appear to be connected with some other malformations about the abdomen, or with an enlargement of the protruded viscera. But besides this, a difficult labor may cause this condition to exist, or at least, increase it; for, according to Scarpa's experience, the cases of enormous hernia occur in children that are born after difficult labors.

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* Traité Practique des Hernies. Translated from the Italian by Cayol, p. 323.

SEMEIOLOGY.—It is easily known by a tumor at the umbilicus, soft and yielding, and always increased on crying or coughing. The tumor can, in most instances, be temporarily removed by gentle pressure. When the intestines is thus removed, a vacant place, well defined, is distinctly felt by the finger.

When this hernia exists, it is generally evident from birth; but in many cases it does not show itself until some days afterward, as the intestines do not protrude until they have been distended with food.

TREATMENT.—Compression is the proper means of treating this affection; that by ligature, formerly adopted, is generally disapproved of by modern surgeons: the rapidity with which the navel is closed, greatly facilitates the cure. These protrusions will continually occur for some weeks or even months after birth; but with a very gentle compression, aided by a bandage, a complete cure is soon effected, if nothing more than the intestine be protruded; and even if it be for some time, even for years, neglected, the application of a proper truss, or even of a bandage, will almost certainly effect a cure.

The object being to preserve the intestine within the abdomen, the means of effecting it may be that which is best adapted to this end, without putting the child to any pain or inconvenience. For the most part a simple roller applied around the body, having in its centre, corresponding with the umbilicus, a graduated compress, is the best. This should be carefully applied, and will answer the purpose far better than any truss which can be procured; for in general a truss is exceedingly difficult to keep properly applied to the abdomen of a young infant.

Congenital inguinal hernia may also exist in young infants. It differs from all others, in the circumstance that the tunica vaginalis forms the hernial sac; the portion of intestine forming the rupture being in immediate contact with it, arising from the non-adherence of the peritoneal canal, by which the testes have descended with the intestine; in consequence of which, the protruded bowel and the testes lie together in the tunica vaginalis. In some cases the testicle has not descended, which should be first ascertained before any bandages are applied.

It is to the genius of Haller,* Hunter,† and Pott,‡ that we are indebted for our knowledge of the causes and morbid anatomy of this species of congenital hernia. For a further detail of its nature, these works, and those especially devoted to surgery, may be consulted.

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* Program. Herniarum. Observat., etc.; Gotting., 1749.

† Medical Commentaries; London, 1762.

‡ Account of a Particular kind of Rupture, frequently attendant on Newborn Children, etc.; 1757.

In some instances, this kind of hernia has taken place for the first time at the age of twelve or fifteen years. It has been supposed that in these cases the testes have remained until that period within the abdomen, and that the bowels accompanied them in their descent.

Semeiology.—To distinguish inguinal hernia is sometimes a matter of difficulty, as hydrocele is apt to be taken for it. In hydrocele, however, the scrotum is translucent; and, with a little care, the absence of the intestine may be detected. One of the principal sources of uncertainty is the increase of both tumors on coughing and crying; and that the fluid, like the protruded bowel, may be returned to the abdomen.

Treatment.—After the hernia is reduced, the same principle adopted in the management of all species of herniæ is applicable to the present form. A temporary bandage, however, is more suitable than a truss for young infants; the latter, however, may be used for older children, as in adults. The bandage and compresses should be frequently changed, as it is impossible to prevent the urine from soiling them, and causing inflammation and severe excoriations of the skin. This will almost certainly effect a cure, if the child be kept still, as the natural tendency during growth is to obliterate the opening through which the intestine has protruded.

EXCERNENT SYSTEM.

The term excernent is used as applicable to the two functions which are discharged by the secreting and absorbing vessels. It is a term used by Dr. Good, as best to express these two functions, which bear the same relation to each other as those of the arteries and veins.

As the consideration of some of the various diseases of the different systems of necessity includes the excess or diminution of glandular secretion, the present system will be limited to such as affect the lymphatics, and those organs whose office is the separation of excrementitious secretion, comprising the kidneys and the skin.

PECULIARITIES OF THE EXCERNENT SYSTEM.

Lymphatic System.—The lymphatic system is a part of great importance, but it was not until comparatively in recent times that its use was properly understood, although some parts of it were known to Galen and Eustachius. The organs which form the system of absorption are of two kinds, the lymphatic vessels and the lymphatic glands. The former, as is well known, perform the office of transmitting into the sanguineous system the fluids which are absorbed from the various surfaces of the body. They exist in two sets—the one superficial, the other deep seated; but both anastomose very freely by plexuses.

The form and arrangements of the commencement of the absorbent vessels, from their extremely minute size, are altogether unknown. Although detailed descriptions and drawings have been made of them as they appear on the internal surface of the intestines, and traced by the microscope to originate in the villi, or small projections that are attached to this part, yet the lymphatic absorbents have baffled the skill of microscopic philosophers to detect their origin.

The lymphatic glands occupy a large portion of the absorbent system, connected with the lacteals and lymphatics. They are small bodies, of different forms and sizes, and situated singly or in groups in the course of the absorbent vessels; always more abundant about the joints, arm-pits, neck, and mesentery. These glands are very numerous in the mammalia. They are rare in birds, and still more rare in fishes. Although apparently essential to the proper transmission of the fluids, judging from their number, yet their use is unknown; but whatever be their use, they are evidently more important in the young, where nutrition is a process of great activity; they are consequently found much larger, and contain a larger quantity of fluid, than in advanced life.

During infancy and childhood the activity of the absorbent system is surprisingly great, while the secretory function, and consequently the process of nutrition, are also in a state of high functional vigor; these changes of interstitial removal and deposite being necessary during this period of growth. The action of this system declines as age approaches, and is very feeble in advanced age. The formation of fat is very abundant in young children, and in the fœtus it appears in masses, unconnected with other portions. Thus, it is found between the muscles forming the cheeks, in the form of globular bodies, and gives to the cheeks of new-born infants the peculiar prominence which distinguishes the form of the face The color of the fat is much lighter in children than adults.

The extreme activity of this system during childhood renders it liable to diseases; and affections of the lymphatic organs are strikingly peculiar to this period of life. Affections of this system at this time, illustrate, in a very remarkable manner, the principle of the predisposition to disease being often dependant on growth.

The lymphatic glands differ in no respect from those of adults, except that their texture is softer and their size larger, and that in young children the lymphatic ganglia of the neck are more liable to be diseased than those of the mesentery; although to this rule there are some exceptions, as I have seen. These glands are diseased in proportion to their development; and those of the mesentery being but slightly developed before the age of a year, are but little liable to be affected by disease before that period.

They are very remarkably under the influence of the atmosphere. When the climate or season is constantly cold and damp, and, especially, if added to this there is also great impurity from want of a sufficient ventilation, and if there exists also a deprivation of light, a complete assimilation of food can not take place, and the development of the body is imperfect.

Like other fluids, that circulating through the lymphatics may be either in excess or deficiency, and thus affect this part of the body with all the consequences of a plethoric condition of the lymphatic system, or with the general want of vigor and tone arising from a defect of the important substances it conveys for nourishment and growth; the former causing those peculiar inflammations which some individuals manifest, so different from the violent sanguineous action, turgescence, and suppuration, with which those abounding in blood usually present. The character of lymphatic turgescence, or inflammation, partakes more of the nature of simple irritation in its general symptoms. So obscure are they, that they do not appear to be attended with any increased action; but the deposition of albuminous matter, and the enlargement of the lymphatic glands, show the existence of this species of plethora. The opposite state of this system will manifest itself particularly in a great loss of energy, and a defect in the general process of nutrition throughout the body.

The lymphatic plethora will also impart to the blood a peculiar quality, known by the deficiency of red globules and fibrine, whereby the body is less capable of resisting the effects of cold, so that not only the glands themselves, as above stated, but the whole body, will be more susceptible to a lessened temperature. Thus, the lymphatic temperament, with its peculiar manifestation in the ganglia, will be formed, and which, like other ultimate molecular conditions of the system, may be transmitted to posterity.

The inflammation of the glands of the lymphatics is often excited by the irritation transmitted along their course. Besides this state of the mucous membrane in producing the mesenteric disease, the effect of insalubrious nourishment is also evident in the irritation excited in these glands by improper chyle formed from it. These, however, will be again brought to notice under the proper head. The effect of [illegible]suitable nourishment in the production of lymphatic diseases is evident, not only in children who have arrived at the age when a variety of food is required, but it is also seen in sucking infants, who become scrofulous if nursed, when first born, by a woman who has been several months delivered.

From the inspiration of impure air and the use of insufficient or improper food, the nourishment of the body is very materially influenced. If, therefore, a due supply of nourishment does not take place, the whole system must suffer, from the digestive to the nutritive functions. In some diseases, the digestion, even of proper nourishment, is imperfectly performed. In others, although perfectly digested, yet when introduced into the absorbent system, from some sluggish action in these vessels, arising from the causes already mentioned, and also from an hereditary transmission, the affections of these glands take place. In other instances, again, the influence of the deranged action is only evident in the process of deposition and nutrition, when the disease will be seated in the ultimate assimilating powers.

One of the most striking evidences of a morbid state, and often in children without other marks of disease, is the arrest of the deposition of animal oil, and the consequent loss of plumpness of the body. In this instance, the action of the secernents appears to sympathize with the diseased action in other parts and tissues of the body.

In other instances the secernents themselves are in a state of morbid action, and, as in the case of rickets, there is a deficient supply of earthy matter, or of phosphoric acid, which are necessary for the formation of bone. In the growing condition of childhood, a full supply is needed, to effect a proper expansion of the body, and to continue and to maintain it in strength and firmness. This supply, when continued in a sufficient manner, preserves this part of the frame in its integrity; but when in any degree defective, causes that condition of the system which so seriously affects the bones; producing one of the most serious and lamentable diseases of childhood. The diseased action of the secernents is also apparent in dropsical affections, diabetes, and the numerous diseases of the skin.

CUTANEOUS SYSTEM.—The excretories of the skin form a very important outlet to the system; and in endeavoring to trace the lymphatics, it is evident that a great number of them have their origin near the cutis, absorption very readily taking place under circumstances favorable to this process. Works on general physiology contain numerous instances and experiments in proof of this power of the cutaneous vessels.

The skin of the fœtus, when first apparent, consists of a viscid coating, through which the immediate subjacent parts may be seen. It gradually increases in density until birth.

The skin exhibits in infancy and childhood no wrinkles, in consequence of the quantity of fat beneath it; when this is absorbed, the skin appears more in the form of folds than wrinkles.

The exhalent vessels of the cutaneous system are peculiarly delicate; and when from any cause the cuticle is abraded by mechanical violence, or by heat, or other chemical action, they are immediately exposed to the action of the air, and are violently excited, and, in children, rarely escape inflammation; resulting in the formation of purulent matter, or in the excessive action of the vessels themselves, pouring out a quantity of serous fluid.

These excretory vessels are also remarkably controlled by the changes affecting the atmosphere, without any removal of their natural covering, being often chilled and rendered torpid by a sudden depression of atmospheric heat. They are also easily excited by irritations in the stomach and bowels, whether they are induced by inflammation, or simply by the presence of irritating food, exciting the mucous membrane. Urticaria is a familiar instance of the general sympathizing influence on the skin.

Eruptive fevers, also, appear to direct their principal force on the excretories of the skin; at least such is the opinion of some eminent physiologists and physicians; but in one or two of these diseases, the whole capillary system would appear to be their seat, both within and outside of the body.

The absorbents of the skin often become torpid in their action, by which only a portion of the fluid deposited is carried off; hence the deposition of more than can be removed, causing accumulations in the cutaneous follicles, whereby various pustular, and other eruptions are produced.

The cutaneous secretions consist of what is denominated sebaceous matter, from the small glands above mentioned, which are situated in the tissue of the skin. These glands appear to have been in a very active state during fœtal life, from the quantity of sebaceous matter which covers the child at birth.

The circulation of the skin is very active in children, and especially in young infants. The consequence of this excess of blood is the high vermilion hue so well known in children.

This color, however, does not exist before birth. As it receives, during intra-uterine life, only black blood, the skin undergoes a very remarkable change in its color at the period of birth, from the red blood, which for the first time circulates through the body on the establishment of respiration. This is an important fact, as the color indicates the condition of the respiratory system.

This intense red color rarely continues beyond the eighth day after birth; from that time it gradually diminishes, and disappears at an indefinite period. It is one of the strongest evidences of the health of the child.

This abundance of fluids gives to the skin its plump, soft and elastic qualities, so different from the harsh and dry sensation which it imparts in old age. This softness continues for some time after birth, and the integuments can very easily be melted into jelly by ebullition. They arrive at their greatest density about the age of puberty.

The skin, therefore, for the greatest period of growth, possesses these marked peculiarities, and from abounding in all the requisites of development, becomes thereby greatly predisposed to numerous diseases in its different tissues: a constitutional irritability peculiar to infants and children. The various strophuli, and other inflammations of the skin, have their origin in the sanguineous turgescence and state of high excitability of the skin in children.

During intra-uterine life, the animal sensibility of the skin, it is supposed, does not exist; but after birth, it is, on the contrary, very great. Its high vital properties render it extremely susceptible to the impressions of surrounding objects. The water used in washing the child, the clothes, and even the stimulating effect of the atmosphere, communicate a great degree of excitation.

All infants present at the time of birth much the same color of the integuments; but about the third month the peculiar hue of the child becomes evident, and the dark complexioned can then be distinguished from the pale and ruddy. The peculiar complexion of children is greatly under the influence of external causes: temperature and exposure, as well as the peculiarities of constitution, cause great variations in whole tribes of people. The reticulated tissue is that on which the natural color of the skin depends, and these alterations are caused by some unexplained change in the blood, which circulates in it in great abundance. Its mucous or fatty consistence has caused a doubt as to the propriety of terming it a distinct coat or texture; but whatever be its nature, it is the proper coloring portion of the skin; it therefore differs greatly in different races of men, and often differs in the same individual in different parts of the body, causing the various spots or moles observed on the skin of children and adults. In some it is absent, or rather from a defective secretion of the rete muscosum, or from an imperfect elaboration of it when secreted, it imparts a peculiar dead white hue to the skin, forming the disease called albinism.

Haller mentions the existence of spotted infants, and also of instances of black children being born of white parents, and white children whose parents were black.

The mottled appearance of the arms, a violet, mingled with white and red, although it would appear to arise from an impediment in the local circulation, is generally regarded as an evidence of health; those that are plump, and whose limbs are large and full, are such as exhibit this hue when their limbs are exposed to the influence of a slight depression of temperature.

Sometimes the skin has exhibited at birth various kinds of excrescences in different parts of the body; they are generally those of a prolongation of the integuments, or the marks known by the name of nœvi materni, which appear to be the first stage of these cutaneous excrescences advancing toward inflammation. Other colored spots are the simple alteration of the cutaneous pigment.

Some authors have described the birth of children whose face, body, and limbs, were covered with hair, and which have been mistaken for wild beasts, and were on this account deprived in ancient times of their legal rights as children.* This condition is simply the continuance of hair, which covers the fœtus in the early part of intra-uterine life. Perhaps it was the persistence of these hairs on the faces of infants, which has been described as a beard.†

Among the most common phenomena in infants, is the healthy separation of the epidermis, described by Orfila, Thierrey, and Billard. It occurs after birth, and only in mature children.

This separation of the cuticle commences at uncertain periods; but generally not before the second or third day after birth; it is usually at its height on the third or fifth day. The duration of this process, also, is very variable; it having continued even as long as two months.

The cause of this process has been explained to be from the transition the child experiences from immersion in the waters of the amnios, by which the skin is kept moist. On exposure to the air it becomes dried, and the cutis then cracks and dies; separating in scales, plates, lines, or powder, according to the part of the body from which it exfoliates.

From the extreme activity of the absorbent system in children, and the like exaltation of the functions of secretion and deposition which have been noticed, it is evident that the process of nutrition and composition, of repairing and building up, is very great during the time of life allotted to growth. At this period, arterial action, so necessary to the proper performance of the secretory function, predominates over the venous; this arterial predominance is evident to the eye throughout the entire cutaneous surface; and anatomical investigations show the same throughout every part of the infant frame. The nerves, also, of organic life, are in a state of high activity; for on a harmony of action of the sanguineous vessels which supply the requisite nourishment, and of the nerves which control the nutritive process, depend the proper and healthy deposition of materials for the growth of the body. In this process the absorbent system largely enters, and on the undisturbed harmony of these, the preservation of the body, in its healthy condition, depends; while, during the process of development, the nutritious or depositing function must be in excess. At the time, therefore, when those changes occur, which are necessary to the increase of the body, and where there already naturally exists a difference in the various powers, a great disturbance of this mutual action must ensue, when any circumstance arises to interfere with the harmony of action. Congestion or inflammation, both sudden and violent, usually follows an interruption of the harmony of action attending the process of nutrition.

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* Haller, Opera Minora., Lib. i.

† Eph. Nat. Cur. Dec. ii., Case 163.

From the activity of the nervous system, also, at this time, by which a healthy vigor and a uniform deposition of materials of growth is preserved, by the universal sympathy of the body with the action of its different parts, arise also those sudden derangements in distant parts, and especially in those where this nervous influence is in high activity, for the growth more particularly of a part, as the brain in children. This sympathetic action is observed in man at all ages, but far more sudden in its invasion, active in its progress, and fatal in its results, in the infant.

The actions connected with nutrition and growth, occur in the parenchyma of the different organs in the internal and external tissues of the body, and in vessels themselves, on which growth depends in every tissue. During the development of the fœtal body, the effect of deranged action in the formative process is evident in the various malformations of the child. After the completion of the body, and on the establishment of independent life, malformations rarely occur, but the body is subject to the various laws which are observed to control it in the adult, and similar diseases are excited into action by causes which produce them during the different periods of life. But how much more frequent and violent they are during childhood, is familiar to every observer; arising from a predisposition acting also during the progress of disease. The natural and necessary harmony of action is thus completely deranged; and the diseases of childhood, when once excited, are remarkable for their violence, and demand a corresponding promptness in their treatment.

Symptoms.

SIGNS OF DISEASE FROM THE EXCERNENT SYSTEM.

The lymphatic organs exhibit few appearances indicative of disease when considered by themselves, independently of their effects in controlling the development of the body generally, or of some particular portions. These are, therefore, more properly considered under other diseases, as the effects of a deranged action are often more manifested in other parts than in the lymphatic system itself.

The peculiar state where the lymphatic temperament predominates, is manifested by the leucopathic condition of the whole body. The process of secretion appears to be very active in some parts, while the absorption of the fluids is not in the same state of activity; hence the fulness of the cellular tissue takes place, particularly in the abdomen, and children with this predominance exhibit an unusual protuberance of this part of the body.

The skin in this temperament is pale, the muscles are soft, and the circulation is slow—the pulse being soft and weak.

The vital force is but languid, and any disturbance of its action is attended with but little inflammatory action of an acute kind.

The enlargement of the lymphatic glands about the neck not unfrequently arises from tinea capitis, and appears to be the effect both of a transmitted inflammation along the course of the absorbent vessels, and of the absorption of the imperfect secretion in the scalp.

The swelling of these glands also arises in the hereditary disease denominated scrofula, and is an evidence of the tendency of the system to chronic inflammation in the different absorbent ganglia throughout the system.

When these tumors persist for a long time, and become of a livid or purple red, they are unquestionably of a scrofulous nature.

These latter tumors rarely appear before the second year, and seldom continue after the seventh. In other instances, however, the disease does not make its appearance till after the seventh, and for the most part disappears about the fourteenth year.

The cutaneous system furnishes many indications of disease arising from its size, consistence, contractility, color, sensibility, and from the existence of inflammatory eruptions.

The size or volume of the integuments depends on the condition of the sub-cutaneous tissue, being much increased in hyperemia of the part, which is very common in eruptive fevers, especially in scarlet fever. It also arises from the presence of fat or serum, and invariably attends local inflammation in a greater or less degree.

The volume of the integuments of the face is not increased in acute abdominal diseases, except when they are complicated with congestions about the brain; it therefore yields a good diagnostic sign in diseases of children, where this complication so often occurs in the progress of their diseases.

A swelling behind the ear, which terminates in suppuration, gives favorable prognosis in diseases during the period of dentition, but is more particularly favorable in exanthematous affections. In acute exanthematous disease, there is always a congestion about the head; and a swollen condition of the integuments of the face always accompanies this state of the head.

The presence of fat may easily be recognised by the uniform volume of the body, and the elasticity of the skin. Œdematous swelling may be known by the pitting of the integuments on pressure, and the shining appearance of the whole surface.

These swellings occur after scarlatina, measles, and erysipelas, but more frequently succeed the first-mentioned disease. Infiltration of the cellular tissue, occurring as a sequel of these diseases, is not of so serious a nature as the same swellings arising from other causes; the former being simply an effect of local inflammation, the latter more often the result of derangements or malformations in the centre of the circulation.

A diminution of the size of the integuments in chronic diseases, especially in affections of the mesenteric glands, is an unfavorable sign; when occurring in acute diseases, the prognosis is not so unfavorable.

An increase of the consistence of the skin takes place with an increase of its volume. The skin of the face, and especially of the forehead, is tense and shining in hydrocephalus. This tenseness will arise from the serous infiltration of the cellular tissue, and is the disease known in Europe as the skin-bound, or induration of the cellular tissue.

The temperature of the skin is very great in all fevers and inflammations, and is particularly marked in scarlet fever. In inflammations of the bowels the heat of the abdominal integuments is also great; and, in general, the heat of any particular portion of the integuments indicates an inflammation in the parts beneath.

The color of the skin depends on the state of the vascular system in young children. In those that are older, emotions of the mind, as in adults, produce changes in its color, showing the influence of the nervous system on the remote circulation.

A leucopathic state of the skin depends on the excess of serum in the blood, and indicates the preponderance of the lymphatic temperament. The change of the skin in eruptive fevers to white, is a very unfavorable symptom; so is also this color in the congested variety of scarlet fever, when often no eruption appears until after death.

A general redness of the skin is its natural color in infants—a local redness is a sign of cutaneous inflammation, and also of inflammation in the subjacent organs; as in the case of such an affection of the brain, the skin of the face exhibits an excess of blood. Alternate paleness and redness of the face denote the inflammatory condition of the meninges, which terminates in hydrocephalus.

The blue color of the skin arises from some disturbance in the circulatory and respiratory apparatus. A preternatural fulness of the small veins of the skin appears to be its immeediate cause.

All causes which prevent the oxygenation of the blood, as such diseases of the heart as interfere with the proper transmission of venous blood to the lungs, will cause a blueness of the integuments. It is therefore usually an indication of the persistence of the foramen ovale, although this has been at times found to exist on a post-mortem examination, while the alteration in the color of the integuments has not existed. The prognosis is decidedly bad if it be connected with an impediment in the respiration, which can not be remedied.

An ashy or earthy color of the skin occurs in protracted diseases of the bowels, and especially in cholera infantum, and in all diseases connected with a chronic disturbance of the chylopoetic viscera and defect of nutrition.

The yellow color of the integuments arises from absorption of the bile, from congestion of the liver, and obstructions in the bile ducts, arising from various causes, but in children more particularly from worms.

The jaundice in children is a much more favorable disease than that occurring in adults, as in the latter it for the most occurs in organic changes of the liver. The orange color of the skin in new-born infants may arise either from bile received into the blood-vessels, or from a peculiar yellowness of the serum. The former may be known by the adnata of the eyes partaking of the general tinge of the body; when it arises from a simple yellow coloring of the serum, the eyes remain unaffected. A yellow color of the skin in young infants, connected with a disease of the stomach and brain, is much more unfavorable than when not thus complicated.

The skin is usually more dry in the first stage of all acute diseases, but more especially in inflammation of the bowels; and if this dry state continue long, the prognosis is rather unfavorable, but not so much so as in adults; and, in general, the excretion of the skin does not, in young children, yield so satisfactory a prognosis as in those that are older. Local sweats, especially when occurring about the head, are unfavorable during acute disease.

Copious sweat often occurs after the disappearance of a convulsive paroxysm in children; it is not then to be regarded as critical, for a recurrence of the convulsions often takes place after a free sweat.

The natural odor of the sweat is acid, but not so marked in children as in adults; in the miliary eruption it is more evident. In affections of the skin the sweat assumes a peculiar odor. In porrigo it has the smell of cats' urine; in scabies an empyreumatic odor prevails; in protracted pityriasis it has a mouldy smell, and small-pox gives an odor resembling fish-brine.

The diagnosis of cutaneous eruptions will more properly be considered under the heads of the respective cutaneous diseases. Eruptions generally, which occur after the continuance of acute or chronic diseases, give a favorable prognosis.

Herpetic eruptions are usually connected with diseases of the stomach and liver. Herpes labialis is a critical eruption in all inflammatory and febrile diseases.

Pemphigus is generally an indication of gastric affection; and the species denominated gangrenosa infantalis is a sign of great debility, and gives an unfavorable prognosis.

The regular course of the eruption in scarlatina and rubeola is to be regarded as giving a favorable prognosis, when not accompanied with severe complications of some internal organs. Its disappearance is to be regarded in an unfavorable light.

Erythematous eruptions, when not caused by any direct application to the skin, are signs of acute or chronic disease of the intestinal tube. Ecthyma occurs as a critical eruption in acute intestinal diseases. Porrigo fovosa is a sign of a scrofulous habit.

The sensibility of the skin is either exalted or diminished in diseases. The alterations in the ordinary sensations of the skin, such as tickling, itching, and prickling, occur in the affections of the skin, at the orifices of the mucous membranes, and are usually the signs of irritation in the gastro-intestinal mucous membrane, either from inflammation or the presence of worms; if at the rectum, of the existence of the oxyures.

These sensations, when existing on the surface of the body, and when accompanying an acute excitement of the blood-vessels, indicate the occurrence of an exanthematous eruption.

DISEASES OF THE EXCERNENT SYSTEM.

SCROFULA.

Scrofula has, from the remotest periods of which we have any records, received a particular attention from physicians, and appears to have been a disease of more universal prevalence than almost any other. Among the moderns, it has been the subject of a number of essays in Europe, where it is much more prevalent than in the United States. Morgagni, Wiseman, Carmichael, Fothergill, and others, have all directed their attention to this highly interesting subject. It would be vain to enumerate all the writers on scrofula which have appeared within the last half century; a few of the most prominent will suffice. The work of Hamilton, on scrofulous affections, contains many valuable practical suggestions.* One of the best, probably, that has appeared, is by Hufeland; first published in 1795. This work has been translated into English, and is a valuable addition to our stock of professional literature.† Baumes and Baudelocque, in France, and Lloyd, in England, have also published excellent monographs of the disease.‡

Struma or scrofula appears under two forms; one, where the disease is confined to the lymphatic glands alone, and is purely a local affection. In this variety it appears as tumors, generally ending in ulceration; situated chiefly about the neck, and is the affection known as the king's evil.|| The other form is, where the disease has become a constitutional affection, and shows itself in dif-

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* Observations on Scrofulous Affections, etc., by Robert Hamilton, M. D.; London, 1791.

† A Treatise on the Scrofulous Disease, by C. G. Hufeland, Physician to the King of Prussia, etc. Translated by Charles D. Meigs, M. D.; Philad., 1829.

‡ Mem. sur le Traitement de la Malad. Scroful., etc. Sur le Virus Scrophuleux, Paris, 1805, par F. Baumes. Treatise on the Nature and Treatment of Scrof., etc., by Eusebius Arthur Lloyd; Lond., 1821.

|| The name king's evil is derived from the supposed virtue in the royal touch, for the cure of this disease. Edward the Confessor was the first who touched invalids suffering with it, and it is said he received this special privilege from heaven; and the same power was attributed to all his lineal descendants. Ancient authors consider the virtue possessed by the king, as referable to his sanctity and not to his royalty. It would appear, therefore, that there exists a very good reason for the absence of this power in some of his posterity. During the reign of Charles the Second, the practice of resorting to the royal touch was at its height; and multitudes flocked to receive the benefit of the royal remedy. The number of persons touched by him in twenty-four years, was 92,107. The newspapers of that period announced the event, and the ceremonies attending it, and detail the particulars on one occasion, where 600 persons were touched. Cromwell afterward tried, in vain, to exercise this royal prerogative.

The practice continued even to the time of Queen Ann; and Dr. Johnson, when a child, was taken to be touched for the scrofula, by the advice of the celebrated Sir John Floyer. The third volume of the Edin. Med. and Surg. Journ. contains a very interesting account of the practice of "touching for the evil."

ferent parts of the system, in the well-known diseases of phthisis, rickets, and the various affections arising from a scrofulous diathesis, and appearing in almost every tissue and organ of the body.

The first-mentioned form, as a disease particularly of the lymphatic system, is that which is the subject of the present remarks.

In former days the term scrofula was applied to the tumors existing in the parts already mentioned, and characterized by the peculiar marks of the disease. The description given of them by the Roman disciples of Hippocrates, corresponds exactly with the disease as it appears at the present time.* From the accounts we have, neither the Greek nor Roman writers appear to have regarded the disease as a constitutional affection, although phthisis, and other diseases depending on a scrofulous diathesis, unquestionably existed.

Etiology.—Scrofula was long supposed, and the idea continued even to a very recent period, to be contagious; but every attempt to propagate it by inoculation, and by exposing those in health to its influence, by placing them in the same bed with scrofulous patients, has failed. It is, therefore, satisfactorily proved, that it does not arise from a specific virus.

The predisposition to scrofula without doubt exists in some individuals by inheritance from their parents. This hereditary transmission consists rather of such a natural arrangement in the ultimate molecules constituting the structure of the body, as to dispose it to a peculiar set of actions, whereby one class of functions naturally tends to certain modifications in their performance, than in the transmission of any peculiar taint in the body, as is the case in syphilis or small-pox. A constitutional peculiarity and predisposition to the disease, therefore, descends from the parent to the child. It does not, however, follow from this that all the children of a scrofulous parent are necessarily affected with scrofula, or manifest that peculiarity which is denominated a scrofulous diathesis; for they may pass through an entire life without any appearance of the disease, from the absence of an exciting cause, and may even transmit the predisposition to their offspring, without being affected with the disease in any other than a latent form.

The hereditary predisposition may be illustrated by the configuration of the external parts of the body, by which children so often bear a striking resemblance to their parents. If this be so in the visible parts of the frame, it may likewise exist in other parts which are concealed from direct observation. The molecular conformation of the body in its several parts, being, therefore transmissible to the offspring, the action of these parts will undergo certain modifications dependant on the organization, and from this cause children will be subject to the diseases with which their parents are affected.

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* Struma quoque est tumor, in quo subter concreta quaedam ex pure et sanguine quasi glandulæ oriuntur; quæ vel præcipue fatigare medicos solent, quoniam et febres movent, nec unquam facile maturescunt; et sive ferro, sine medicamentis curantur, plerumque iterum juxta cicatrices ipsas resurgunt; multoque post medicamenta sæpius; quibus id quoque accedit, quod longo spatio detinent. Nascuntur maxime in cervice; sed etiam in alis, et inguinibus, et in lateribus. Celsus, Lib. v., xxviii.—7.

In children, where the disease is hereditary, the constitution exhibits externally a peculiar appearance, and this diathesis may be known where there exist a softness and flaccidity of the flesh, light hair and blue eyes, florid cheeks and a smooth skin. Children with this scrofulus tendency often have a large and tumid upper lip.

Although at every period of life the disease may be developed, yet unquestionably childhood is the time when the predisposition to the local disease is the greatest; in addition to this, scrofulous affections of the eyes and bones are most likely to occur also at this period. After puberty the lungs become more often the seat of this peculiar affection than before that period; and there is nothing that so clearly exhibits the influence of growth in developing certain diseases, as the change in the liability to disease manifested in the absorbent and lymphatic system.

This predisposition is not hereditary in every instance, for numerous causes may arise to produce a morbid change in the action of the lymphatic system, and thus give rise to the disease; this, it is evident, must have at some time been the case, even in hereditary diseases. It may therefore be acquired by the action of the same causes which develop it in those subjects who are predisposed to the disease. This important fact illustrates, in a remarkable manner, the pathology of the disease, which will be considered hereafter.

Among the most common exciting causes, is the influence of a cold and humid climate. The effects of climate are of familiar observation; and the change from a cold, wet country, to a warm and dry region, upon those who suffer from the various forms of a scrofulous habit, is well known, producing alterations which no medicine can effect, while the change from a warm climate to a cold, damp country, will cause the development of scrofulous affections, as has been observed to occur in the youthful inhabitants of the East and West Indies on their removal to a colder region. The variable weather so often occurring in the winters of temperate climates, is a fruitful source of the disease, especially when, as is always the case, this variation is accompanied with great humidity of the air; and it is more common to find it in these climates, or in those elevated situations of hot climates which expose them to sudden atmospheric changes, than in those countries where a uniform cold is maintained from the commencement of winter until its close.

The cold is subject to but little vicissitudes in the winter in the northern sections of the state of New York, the New England States, and Canada, and the disease consequently is less prevalent than in other portions more subjected to alterations in temperature.

The effect of this cold and humid atmosphere is not only in the obvious influence it produces on the disturbance of the capillary circulation of the surface, but also by its constant action on the extensive respiratory surface, by which an irritation is maintained in the lungs, whereby an imperfect change is effected in the blood—a change interfering with the nutritive process; for the proper performance of which a full alteration in the blood should be produced. Such would, indeed, be expected to be the case, where the disease exists primarily in that part of the system which forms so important an office in the composition of the body as the lymphatic.

But in addition to this cause, there exists another, having a close analogy to the former; and this is the deterioration of the atmosphere, from the crowding together of a number of inhabitants in large towns and manufactories. It is well known how much more prevalent this disease is, in all its forms, in towns and cities, than in the pure air of the country; and every one is familiar with the distressing consequences manifested in the different scrofulous affections in the town of Manchester, in England, a number of years since, as recorded by Dr. Percival.* The whole number of deaths from scrofulous cases, as mentioned by him, was about one third of the entire number of deaths among the children of that place. In the hospital for sick children, at Paris, one half of the bodies that were opened exhibited marks of scrofula in some part of the body. Dr. Alison has conclusively established this fact, by carefully comparing the relative mortality from this cause, among children in the pure air of a country parish in Scotland, and that of the manufacturing town above mentioned.† The bad effects of impure air on the tender and susceptible frame of children, I have frequently had occasion to observe, and have often noticed that it is far more injurious of itself than improper diet in older children; the latter, although unquestionably a great cause of diseases, may yet be rendered digestible by habit; and an entire change of food, at first difficult of digestion, may become suitable for the child, and be easily digested. These remarks apply more especially to the formation of the constitutional predisposition.

This agent is so evidently a cause of scrofula, that Baudelocque has given as his opinion, that it is perhaps the only cause of the disease; and Sir James Clark considers it as a more powerful agent in the destruction of human life among children living in workhouses, where we have seen that scrofula prevails, than impoverished diet.*

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* Percival's Works, vol. iii., p. 107.

† On Path. of Scrof. Dis., Trans. Medico-Chirurg. Soc., Edin., vol. i., p. 383.

In accordance with this are the facts mentioned by Mr. Carmichael, of Dublin, in his account of the scrofulous disease which prevailed in the House of Industry in that city, where one hundred and fourteen children were lodged in one ward, the air of which became insupportable in the morning, while hundreds were confined in the school-room during the day; the disease prevailed under these circumstances in all its fatal violence. The effects of impure air, even on the fœtus, in interfering with the nutritive process, is evident in the remarkable fact mentioned in the London Medical Gazette, of the year 1832, that monstrous births are not unfrequent in the gloomy dungeons of Lille. The influence of light on the development of ova, has been shown by Edwards in experiments on those of tadpoles, the regular process of which is materially affected by a deprivation of this agent.†

It is here proper to remark, that scrofula is by no means so prevalent in this country as in Europe. The same cause developing a different morbid condition of the system, and affecting chiefly the chylopoetic viscera. From the influence of climate a diarrhœa is often the result of confinement to an impure atmosphere; as was recently the case among the pauper children of this city, where a severe and fatal affection of the bowels prevailed, arising from the badly-ventilated condition of the building on Long Island, in which they were lodged.

To this cause may also be added that of bad food, which, when united to those already mentioned, will invariably produce a diathesis favorable to the formation of some form of scrofulous affections. Imperfectly-elaborated milk will also dispose the sucking infant to scrofula; and Wiseman mentions that a child nursing from a scrofulous nurse, will have the disease developed. Whatever differences of opinion there may be as to its precise pathology, it unquestionably, when first developed, owes its origin to those causes which produce an alteration in the nutrition of the system; and therefore we find that the combined influence of a cold, wet atmosphere, a confined and ill-ventilated residence, and an insufficient diet, are the principal incidental causes of the disease; and when a union of these circumstances is found, strumous diseases prevail more extensively than where any two of them alone are present. These have been more especially pointed out in an excellent monograph by Baudelocque, published in 1833.

Local injuries have also, in children predisposed to it, excited it into activity; so also has small-pox, measles, or hooping-cough, and any protracted disease which acts on the general system, as the other causes above stated, by impairing the energies of the body, and thus affecting the process of nutrition.

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* Clark on Consump. and Scrofula, p. 233.

† Influence des Agens Physiques sur le vie, p. 398.

SEMEIOLOGY.—The disease shows itself in the lymphatic glands, principally of the neck, in children, about the third year, or from this period until puberty; after this it seldom appears in this form.

Tumors appear not only on the side of the neck and behind the ears, but under the chin and in the arm-pits. They are at first moveable, and of an oval or globular form, and a little elastic to the touch. They are at first without pain and discoloration of the skin; in this state they may continue for a long time, and will even acquire a large size, without any suppuration or ulceration, but will be removed by absorption. This, however, is not the usual course of these scrofulous tumors. The skin, for the most part, assumes a reddish or purplish hue, when their consistence undergoes a change; from being slightly elastic they are now soft, with a feeling of fluctuation in some parts of the enlarged gland; for this softness, and the ulceration which follows, are by no means uniform throughout the diseased part. The skin over the softened portion becomes thin and pale, and at length small openings form, giving passage to a kind of purulent matter, at first of a yellowish color, and curdy consistence. These openings unite, and the discharge changes to a fluid resembling whey. These ulcerated tumors gradually subside, but others arise near them, passing through the same stages of tumefaction, softening, and ulceration. At other times the ulceration proceeds, and a sore, very tedious and unmanageable in its nature, is the result, discharging a sanious fluid, mixed with curdy flakes. This ulceration sometimes heals partially, while the discharge continues in another portion, and fresh tumors, which also degenerate into ulcers, form in their vicinity. This irregularity in the ulcerative process, partial healing, and the formation of new tumors and ulcers, give to the affected part, when healed, a very unsightly, and even, at times, deformed appearance, from the irregularity of the cicatrices, and the deep scars, crossed by bands and wrinkles, and the puckered form of the skin.

MORBID ANATOMY AND PATHOLOGY.—The different stages of the enlarged glands of scrofula exhibit different appearances in the texture of the morbid part. Thus, Dr. Abercrombie states that they exhibit, in the first stage, when cut, a uniform fleshy texture, of a pale flesh color, and soft consistence. This color becomes paler and the texture softer. The glands then undergo a change in these particulars in different portions, for some parts lose their flesh color, and appear somewhat transparent, while the texture has the appearance and consistence of cartilage. Alterations are, also, at the same time observed, from the natural color to the peculiar white, which is the last stage of morbid alterations, and in every respect analogous to the white tubercle in the lungs.

The irregular progress of the disease is manifested in the existence, at times, of all these changes at once, observable in different parts, of large masses of the disease. In the most advanced stage, the white, opaque, ash-colored, tubercular matter abounds the most, and is afterward softened into the well-known cheesy and ill-conditioned suppuration.*

The pathology of scrofula has been the source of much discussion, but the opinions appear to have settled down to the inflammatory nature of the disease, in all its forms, whether of glandular enlargement or the formations of tubercle. With respect to the glandular or local affection, which is the form of the disease now under consideration, it would seem, in some instances, to be a simple congestion of the gland at first, by the lymph flowing through the vessels, and which afterward excites, by its mechanical distension, the inflammatory action with which the glands are affected. At other times the inflammation appears to be coeval with the existence of the tumors, and from the commencement identified with the disease; under both circumstances it is evidently a modified inflammation, as we see it here, although in some forms it appears to be destitute of all other characters of inflammation than that of tumefaction. The opinions of several writers are, that it is always a disease of debility, and dependant on debilitating causes.† Dr. Good appears inclined to this opinion, and quotes Garn and Richter.‡ By far the greatest number, however, adopt the opposite view. Broussais,|| in France, Alison,§ in Great Britain, Gross¶, Paine,** and others, in the United States, all identifying tubercle with the disease before us, and regarding it as dependant on one and the same cause. It was formerly supposed that an acidity of the humors was present in scrofula; and that an altered state of the lymphatic fluid, in some respects, existed, has been the opinion in almost every country. Hufeland's views are, that the disease consists of debility, with a specific irritation of the lymphatic system, and a peculiar alteration of the lymph. This scrofulous acrimony, as he terms it, he considers as the alterations produced in the lymph, by the altered action of the lymphatic glands, whereby the assimilation is not proper

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* Abercrombie on the Nature and Origin of Tubercular Diseases. Trans. of the Medico-Chirurg. Soc., Edinburgh, vol. i., p. 685.

† Armstrong on Acute and Chronic Diseases, vol. ii., p. 101.

‡ Study of Medicine, vol. iii., p. 221.

|| A treatise on Physiology, p. 470.

§ Trans. of the Med. Chirurg. Soc., Edin., 1824.

¶ Path. Anatomy, vol. i., 1834.

** Med. Comment, vol. ii., p. 608.

ly effected, and an imperfect fluid is the result, which becomes a source of irritation to the glands.* A change in the fluid is not incompatible with the opinion of the congestive or inflammatory nature of the disease.

The difference of opinion which has prevailed as to the nature of scrofula, may admit of some explanation when the various causes which are known to modify the same disease are considered. Among them may be mentioned climate, and an imperfect development of the diathesis, which it is well known determines the tendency of inflammation in the formation of scrofulous diseases.

The difference in the type is what is observed in all diseases, in different countries, and probably there is no disease which presents the same uniform character in all; as climate influences the development of diseases, so it will also exert a modifying effect on the disease when formed. The differences thus arising, are the only way to account for the discrepancies of existing opinion as to the nature of the same disease. This is remarkably illustrated in measles and scarlet fever, which in some countries and in certain seasons appear scarcely to require any remedy; while under other circumstances they may be violently inflammatory, or be attended with great prostration. We need but refer to past records to be satisfied of this fact, and of the great benefits arising from the use of remedies at one time, which at others have been discarded, from having been found decidedly hurtful. In the scrofulous diseases of children the same condition may, and doubtless does exists; and the continual exposure to the causes already mentioned, but more particularly to the effects of impure air in closely confined and crowded habitations and manufactories, may control the actions of the system, so as to prevent the development of a true inflammatory action; while it is easily conceived that in those cases where a predisposition exists in subjects removing from a warm to a cold climate, and the disease for the first time excited by the action of the latter cause, scrofula may exist in a state of active inflammation.

An imperfect development of diathesis, which determines the character of the inflammation in scrofulous habits, or, perhaps, as it may be better expressed, the proportion of normal action still maintained in the system, will impart to the diseased action a character more or less allied to diseases in organs which have undergone but little alteration from their normal state.

This leads to the consideration of the predisposing cause of scrofula, which must be sought for in the nutritive process, whether the alterations in the composition of the body during the time of growth have been hereditary or acquired; for we must go back to the ultimate state of interstitial action, in order to obtain some idea of the pathology of scrofula, as it appears in the different organs, depending, as it clearly does, on the imperfect action of the nutritive process. This view of the departure from the healthy state of the organs will present the subject, if not in a form perfectly satisfactory, yet in some degree approximating to the truth, as it will exhibit the disease in question as depending on that important part of the nutritious function, the lymphatic system, so actively engaged during the period of growth.

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* Op. Cit., p. 63.

That which strikes the observer, when considering scrofula as manifested in the remote tissues, is the peculiar phenomena which arise on the application of the ordinary exciting causes of inflammation. A chronic inflammatory action ensues in some of the tissues, with characteristic symptoms, producing a disease remarkable for its obstinacy; while in others tubercles form, giving rise, when in the lungs, to phthisis.

The phenomena are so different from those of inflammation occurring in an individual not possessing the scrofulous diathesis, as at once to arrest the attention of the inquirer, and direct it to some change in the original composition of the affected part, by which a very marked alteration is produced; if it were otherwise, the phenomena would be such as are usually observed in properly elaborated tissues. It must, therefore, be dependant on the nutritive process—on the deposition of ultimate molecules during the growth of the body, in some degree destitute of the proper proportions which are necessary to form the part in its normal state.

This, as we have already seen, may be hereditary or acquired; in both instances, depending on the supply of healthy materials in the blood, which is the agent employed in the nutrition of the body. The blood being composed of the constituents of the chyle and lymph, must necessarily be affected with any changes which may occur in them, and thus affect the condition of the various parts of the animal frame.

The absence of this disposition may usually be known by the existence of the sanguine temperament. The blood abounds in fibrine, the complexion is dark or ruddy, the muscles firm and well marked; those, on the contrary, that possess the diathesis, which leads to the formation of tubercles, exhibit a softness of the muscles, possess a light or delicate red complexion; the red particles of the blood and the fibrine being deficient, while lymph and albuminous matter abound. All this impoverished state of the fluids arises from the causes already mentioned as productive of scrofula; and the preponderance of the lymphatic system will naturally create a lymphatic plethora.

It appears, therefore, to be connected with the active state of the lymphatic vessels, as there is in scrofula a manifest excess of albumen, chemical analysis having detected a large proportion in lymph.

Although there is still needed a much more extended set of experiments on the subject of lymph than has yet been made, to render our knowledge in its change, either in quality or quantity, more satisfactory, yet abundant evidence exists that it is in greater quantity in time of youth. Haller has shown that the lymphatic glands contain a larger proportion of fluid in the young than in the adult.* Mascagni also states that these glands are more turgid with lymph at this period of life.† A larger quantity also exists after a long fast.

If an abundance of lymph exists, the blood must be surcharged with albuminous materials, and a deficiency of fibrine prevails; from this cause an imperfect composition of the body must ensue, which is thereby predisposed to take on a peculiar diseased action, on the application of an exciting cause of disease. This is seen to exist constitutionally in phthisis and rickets. The last-mentioned disease exhibits, in a very evident manner, the effects of imperfect nutrition; for during the process of growth a remarkable change occurs in a healthy subject in the consistence of bones, while in those individuals suffering under the peculiarities of constitution caused by scrofula, the bones are often defectively nourished, and their development does not correspond with the development of the body generally. The tubercular disease, on the contrary, does not exhibit similar marked effects from growth with imperfect nutrition, for the soft parts undergo but little change from growth, but are formed with much the same elements as they afterward possess.

The consideration, however, of constitutional struma, is foreign to the object of the present chapter; but the diseases of a general character, which more especially affect children, and which are modified by a scrofulous constitution, will be treated of under their respective heads. The subject has been merely alluded to as in connexion with the action of the absorbent system, the important agent in moulding the body during growth. There can be no question, as is remarked by J. Hunter, that the nutrition of the body is supplied principally by the chyle, and that the office of the absorbent system is to preserve the symmetry of the body, while nutrition from this source is but a secondary function.

If, from any cause, the latter function is more than ordinarily and permanently excited, either by the hereditary constitutional peculiarity, or by the continual use of insufficient and improper food, which acts not only in supplying the blood with imperfect chyle, and thus directly affecting the process of nutrition, but likewise by exciting the action of the absorbent system to supply the defective nourishment, whereby an undue quantity of albumen is conveyed to the blood, an alteration of nutrition would ensue.

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*El. of Physiology, vol. ii., p. 325.

† Vas. Lymph, pt. 1, sect. 5, p. 33.

The most severe and violent forms of constitutional strumous affections are connected with impure air. The blood thus deprived of the salutary change it undergoes when exposed to the influence of oxygen, interstitial nutrition is directly effected. When, however, inappropriate food is used by children, the effect appears to be more direct on the lymphatic system; but in all its forms an undue supply of albumen to the blood exists, showing an increased supply of materials through the lymphatic vessels.

The local effects of a deranged action of this system, in the production of the chronic irritation, and enlargement of the glands of the neck, axilla, etc., and known as scrofula, or the king's evil, is the disease more especially considered.

This affection is not to be confounded with that occurring in the glands, arising from the transmission of the inflammation along the course of the lymphatics, and traceable by a red line or streak, which, for the most part, is painful to the touch. This not unfrequently occurs in inflammation of the skin, tinea capitis, etc. When the glands are inflamed from this cause, they are rapid in their swelling, hard and painful to the touch, and terminate by the formation of a true pus. Such inflammations are likely to occur in those of a sanguine temperament.

In such as possess the scrofulous diathesis or lymphatic temperament, an entirely different condition of the gland occurs; the symptoms of which have already been described. In this form a true suppuration never takes place, but the termination shows a condition differing from a sanguineous inflammation. This form of disease is described by M. Broussais as a sub-inflammation. If by this is meant an inflammation produced by the white blood or lymph, and corresponding in this respect with what is usually known as inflammation, produced by the agency of the red, fibrinous blood, the designation is correct. But it is evident that the term is very liable to be misunderstood; for there is not at first, essentially, a real inflammation in the irritated and enlarged glands, although it usually occurs in the course of the disease, and may at times appear so early, as to be almost simultaneous with the tumefaction of the gland; for it may inflame, and also be congested, with albuminous fluid contained in them; if it occur afterward, it is produced by the mechanical pressure of the part.

The fluid conveyed through the lymphatics, in a healthy state of the part, is arrested in the glands, and there undergoes some change, as appears from experiments made by Mascagni; for the lymph entering into them differs from that which passes out.* They therefore appear to form some important part in nutrition; but in what this consists it is impossible to ascertain; that it is important, is evident from the large size of these glands in children and youth, when nutrition proceeds rapidly, and the action of the lymphatic vessels is great, from the necessity of the continued changes in the dimensions of all the parts of the body. This is a very striking illustration of the principle, that growth is a great predisposing cause of disease.

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* Mascagni, Loc. Cit.

Here, then, we have, at an early period of life, a greater action of these glands; and from the laws of physiology, the more an organ is exercised, the more is it predisposed to disordered action, and from their necessary incessant performance of their function is found their liability to disease.

What is the irritation which first causes a stasis of the lymphatic fluid in the gland is impossible to say; very little, if anything, is known with respect to the normal action of these parts, and much less of the departure from it. That a congestion of lymph occurs is evident from the fact, that, sometimes when these glands yield a fluctuating feeling on pressure, and, from the supposition that pus exists, an opening is made, nothing will flow but a little blood and lymph, and in a short time lymph alone will ooze from the wound. It may be supposed that some irritating qualities exist in the lymph itself, as it owes its origin to all the varying parts of the body; for although in appearance the same, yet close examination has detected a difference in lymph flowing from different parts; and it is also an important fact to remember, that, while the lacteals possess an elective property, and only convey chyle, the lymphatics will take up anything that is presented to them, both such as are extraneous to the body, and such as form the varied parts of the body itself, both solid and fluid. Besides those different actions of these two sets of vessels, another property they possess might also tend to produce an alteration in the fluids of the one and not in the other. It is the difference in their respective functions: the one simply conveys the nutritious fluid already prepared, the other elaborates what it removes; hence an altered and morbid condition may exist from the imperfect action of the vessels themselves.

In the first stage, therefore, the disease is always caused by a simple lymphatic congestion of the part, and is variously modified with regard to the accompanying inflammation, by the peculiar constitution of the patient and the influence of climate. While in some places it has been regarded as a disease altogether of debility, in others it has, in every instance, been considered, as one of inflammation, more or less acute. It can easily be conceived, that among children suffering from the combined effects of bad air and impoverished diet, insufficient also in quantity, a degree of debility must ensue, which would altogether forbid the employment of depleting measures; while such as have not been thus exposed will retain a different amount of vigor, materially controlling the disease when formed.

The disease in some is one of a purely lymphatic congestive character, for a long time exhibiting no pain on pressure, and exhibiting neither heat nor discoloration of the skin even in such as do not possess a marked deficiency of stamina; the inflammatory stage, however, is always sure to make its appearance before suppuration ensues. In others this inflammation will quickly appear on the enlargement of the gland; this occurs when the lymphatic temperament is but slightly developed, where any irritation will readily excite inflammatory action. This accumulation of lymph imparts to the suppurated gland its imperfect character, as regards the pus secreted, which possesses but little resemblance to properly-formed pus, being a thin fluid, mingled with curdy matter.

TREATMENT.—The principles of the treatment have varied at different times, according to the existing ideas of the nature of the disease. The supposed presence of acids in the fluids has led to the employment of alkalies. Narcotics and sedatives have also been much used, doubtless also from the irritation caused, as was believed, by the acrimonious nature of the lymph, while the actual benefit arising from their use may be referred to allaying the irritability of the system generally, and thereby, in some instances, affording nature an opportunity of returning to the normal exercise of her functions. The doctrines which have more recently prevailed, have induced some physicians to consider it exclusively, and under all circumstances, as inflammatory, and they have consequently been induced to use local antiphlogistic measures, and to rely solely on the local abstraction of blood for the treatment of scrofulous tumors. The judicious physician will not adopt either mode to the exclusion of others, but will suit the remedy to the condition of the existing case.

According to the views of the nature of the disease above stated, the treatment naturally divides itself into, 1st, hygeinic; 2dly, general; 3dly, local.

As the disease depends on the abnormal action of the absorbent system, a function of the greatest importance during the period of childhood, a time of active nutrition and growth, we may reasonably look for a natural tendency of the system to the normal exercise of its functions, as the period of demand gradually ceases. This may often be effectually anticipated by a judicious application of the rules of hygeine.

The food ought to be nutritious, and in every respect suited to the condition of the patient. It seldom happens that we see the disease in such a form as to require a decidedly tonic and highly nutritious diet, but a proper supply of nourishment is absolutely necessary to the healthy action of the nutritive process. Wine and malt liquors, so much recommended formerly, are rarely, if ever, required, for this disease in the United States.

In connexion with appropriate diet, there is nothing so beneficial as free exercise in the open air; nothing indeed can compensate for the want of this. Where it is used, children seldom suffer from scrofula; and the natural exercises of running, leaping, etc., so incessant among children, keep their absorbent and capillary system in full activity, and distribute the tone and vigor thus induced over the whole frame. The effects of active bodily exercise in imparting the signs of the proper supply of red fibrous blood, is evident in all persons whose employments lead them much in the open air; and among such of the ancients whose education was founded in a great degree on gymnastics, scrofula was but little known.

For the same reason, those children who are disposed to scrofulous diseases ought to be guarded in the too early use of their intellecual faculties, especially in learning long lessons at school. Their tasks ought to be short, and followed by some amusing occupation. They should not be subjected to severe punishments, but every method ought to be taken to invigorate the system, by rendering their necessary studies as much a pleasure as possible.

It will also be necessary to pay particular attention to the sleeping apartments of children, a subject often receiving less attention than almost any other hygeinic regulations of children. They, for the most part, pass the greater part of their time in them; and a close attention to ventilation, and a proper choice of their situation, where the latter can be made, is of vast importance; not only in the management of the disease before us, but also in all affections of children. Mattresses form the best bed for them; the accumulation of heat, and of the miasms which are disengaged from the body during the night, do not so easily take place on a hard surface as in a mass of feathers, where their escape is almost impossible: the relaxation from these causes, as well as from the excessive perspiration, will produce a debility greatly affecting the functions of the absorbent system. If it be possible, the bedroom of children ought to be in an upper story, with windows so arranged as to allow of a free ventilation. The habitation, also, should, if it be in a low and humid situation, be removed to a dry and warm place.

All these details it may be said, are impossible to have properly attended to; but much may be done in the prevention of diseases in children, by procuring a free circulation of air.

While these precautions are used, the body ought to be kept well protected with suitable clothing. The variations of temperature produce the most serious consequences ; and the use of woollen garments in winter, and suitable protection from sudden changes at every season, should form a part of the hygeinic measures.

In connexion with these measures, frictions are very important agents in the management of weakly children; they have a direct effect on the sanguinary capillaries, and also excite the radicals of the absorbents, whereby circulation through the lymphatics is promoted. These may be performed by means of a soft flesh brush, or a piece of flannel or dry sponge, three or four times a day.

An entire removal may, in severe cases, become necessary; and a residence near the sea, in the summer months, will be an efficacious means of invigorating the system, where the exhausting summers destroy the energies of the system. In short, every rational means of improving the general health will be needed in the prevention and cure of scrofula.

The application of pharmaceutical agents may be either general or local; and the general principles of science will be our guide in their use generally, even in such as appear to partake in some degree of the nature of specifics.

When commencing the treatment of this disease, the condition of the primæ viæ should be examined, and if evidences of derangement be found to exist, the treatment should be commenced by restoring the secretory functions of the chylopoetic viscera. For this purpose purgatives must be employed. The use of resinous cathartics, Hufeland remarks, is more important than is generally supposed; and where there is a want of tone in the stomach and bowels, with a tendency to constipation, jalap he has found the most useful of purgatives; besides its influence in relieving the bowels of their load of mucous secretion, an impression appears to be exerted on the lymphatic system. Mild purgatives have but little effect on the indolent engorgements of children. He gives it in doses of from four to six grains, to children two or three months old, combined with a little magnesia. It appears to be much more safe to give it in smaller doses, in the proportion of six to fifteen grains, for children from three to six years. When an addition to its purgative qualities is needed, any of the neutral salts, or the bi-tartrate of potash, may be combined with it, or it may be combined with calomel. The addition of oil of lemon will correct its nauseous taste, and it may be rubbed up with a little sugar.*

* ℞ Pulv. Rad. Jalapæ, gr. xv.
Hydr. Subm.., gr. iij.
Oleo. Sacch. Citr., ℈j. M.
For a child eight years of age.

The resin of jalap is a good purgative, and may be given in an emulsion, rubbed up with sugar or with almonds.

Aloes is another of this kind of purgative medicine, which will be found very efficacious in the treatment of this disease, when attended with much derangement of the abdominal viscera, as it combines a tonic property with its cathartic qualities. Wherever, therefore, there exist a loss of appetite and a general debility, aloes will be a useful article for the correction of the disordered action of the bowels, and to impart, at the same time, tone to the stomach. Aloes, combined with rhubarb, has been long a favorite purgative with German physicians; and where the object is to procure a free evacuation without the loss of strength, which often attends a copious action of the bowels, these substances are of great value.[*]

While speaking of the necessity of attending to the state of the primæ viæ, it will be the proper place to allude to alkalies and antacids in general, which have been so much in use in the treatment of this disorder, and the benefit of which has been so abundantly demonstrated by experience. Lloyd is very partial to antacids, particularly soda; and without reference to any acid condition of the lymph, it is a sufficient indication of their necessity when there exist evidences of acidity in the stomach; for the digestive process is, under such circumstances, very materially deranged, and the nutritive functions also more or less disturbed.

They have been for a long time in use, and were supposed not only to destroy the acid of the stomach, and thus remove one of the exciting causes of scrofula, by improving the functions of the digestive organs, but also by exerting an action on the lymph in correcting the acid which it contains. Any of the alkalies or absorbent earths may be employed for fulfilling the above indication, according to the condition of the bowels; if they need to be moved, soda or potash may be combined with the cathartic medicine already mentioned.[†] If a simple correction of acidity is all that is needed, they may be given alone[‡] or combined with some mucilage,[||] or if there exist no evidence of gastric inflammation, and a mild stimulant appears to be needed, combined with some aromatic infusion.* The bi-carbonate of potash has been particularly recommended in scrofulous affections by Richter and others. Where there is a decidedly debilitated condition of the system generally, needing tonics and bitter infusion, the Colombo root will be found the best, as it is an excellent stomachic, with but little stimulating qualities, and does not astringe the bowels; it may be given in the dose of a tablespoonful of the infusion of the pharmacopœias, either alone or combined with some alkali and aromatic confection.

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[*] ℞ Pulv. Rhei., gr. iij.
Potass. Bitart., gr. vi.
Oleo. Sacchar. Macid., ℈ss. M.
ft. Pulv. dent. tal. dosi., No. vi.
One to be given thrice a day.

[†] ℞ Rad. Rhei, ʒj.—ʒij.
Digere per hor. c.
Aq. Fervid., ℥j.
in colat. solve,
Potass. Bi-carb., ℈j.
Syrup. Aurantii, ℥ss. M.
Sit. Mistura.
A tablespoonful three or four times a day, to a child three or four years of age.

[†] ℞ Potass. Bi carb., ʒss.
Aquæ Destill., ℥iss.
Solve.
A teaspoonful three or four times a day.

[||] ℞ Potass. Bi-carb., gr. x.
Mist. Acaciæ, ʒj.
Vitell. Ovi, No. ij.
Aquæ Font., ℥iij.
Syrup. Simpl., ʒj. M.
ft. Emulsio.
Dose, a dessert-spoonful three or four times a day.

Dr. Hamilton advises small portions of mercury or antimony, or both combined, in very small doses; or of neutral salts dissolved in water. The former of these he recommends for infants and the latter for children, especially toward the age of puberty. He decidedly prefers the "neglected remedy of the polycrest salt." His practice was to administer an aloetic pill at night, and the sulphate of potash in the morning, continuing this practice for several weeks. After the bowels had been freely acted on, he then commenced with chalybeate preparations, but without discontinuing the use of the neutral salt.

The general remedies for scrofula, which have been considered almost as specifics, are all of a tonic and stimulating nature, and are therefore only applicable to the stage of simple engorgement without inflammation. Whenever, therefore, there is pain on pressing the tumors, or a slight febrile action, these should not be used, but the treatment must be conducted on the general principles of combating inflammation and fever, but particularly by attention to the condition of the stomach and bowels.

Mercury has long been an efficacious remedy in the treatment of scrofula, and, under the circumstances just mentioned, may very advantageously take the place of other remedies of a general nature. It is evidently a very powerful exciter of the lymphatic system, while it augments the whole secretory functions. It is, therefore, useful in cases where there exists febrile reaction, and when the fever is great should be combined with antimony; and it is to this stage alone that its use should be confined. In those cases where there is great irritability, it should be carefully avoided, and in protracted cases, where there is much constitutional affection, it is inadmissible. It has been used in scrofula, combined with hemlock and antimony. The subjoined prescription is from

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* ℞ Aquæ Fœniculi, ℥vi.
Potassæ Bi-carb., ℈ij.
Syrupi, ℥j. M.
A dessert-spoonful occasionally.

Fränkel.* Mercury should never be given to salivation in this disease.

Among the remedies of a tonic nature which have been considered almost as specific, is the chloride of barium (muriate of baryta), used by Hufeland in Germany, and Crawford in St. Thomas' Hospital, in London. It has been highly extolled by many German, English, and French physicians. Hufeland recommends it in such cases as are attended with increased irritability and inflammation. It ought to be given with great caution, as violent griping may be caused by an overdose, together with hypercatharsis and inflammation of the throat and stomach. Pinel and Hebrerard have seen these effects even from a single grain of the medicine given every other day. I have never used it; but if such are the violent effects occasionally arising from its use, prudence would dictate its abandonment altogether, notwithstanding the high encomiums bestowed on it by the distinguished physicians above mentioned, particularly as we are in possession of a much safer remedy, which has within a few years been introduced into practice, and which has almost taken the place of other measures of treating the chronic engorgement or indurated glands in scrofulous affections.

Iodine was first introduced into practice by M. Coindet, of Geneva.† Its operation is decidedly tonic, as the augmentation of appetite, and the increased strength of those who use it judiciously, and in small doses, prove. Lugol‡ asserts that he never observed emaciation to occur from its use, when properly employed, but on the contrary, an increase of vigor was the result. Its action on the nervous system increases that of the heart and arteries, and restores the functions of the sanguiferous and organic systems, as remarked by Brera. These observations have been confirmed by Sir G. Clark, Baudelocque, and others.

The symptoms usually observed from its internal use, are an increased flow of urine and improved appetite, the alvine evacuations are rendered more frequent, and at times the action of the salivary glands is increased. Although these are the ordinary symptoms produced by the use of iodine, yet, in some instances, these salutary results have not followed; it will therefore be necessary carefully to watch the effects of the medicine, and to suspend its use if an opposite effect is produced, to be renewed at the interval of a week. Sometimes it is excessive in its action on the bowels, and accompanied with severe colic; it must, under these circumstances, be suspended for a time, as it is evident that a morbid excitability of the mucous membrane exists, forbidding the employment of this remedy.

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* ℞ Hydr. Subm.
Antimon. Oxysulph., āā. gr. j.
Extr. Conii, gr. j.
Sacch. Alb., ℈j. M.
ft. Pulv. dent. tal. dos. No. xij.

To children under two years, half a powder morning and evening. To older children a whole one.

† Bibliothéque Universelle, July, 1820.

‡ Mem. sur l'Emploi de l'Iode, etc., Paris, 1829.

From its stimulating effects, its administration ought to be limited to those cases in which there is no inflammation in the tumors, and where indurated tumors remain after the disease has passed through its stages. M. Lugol recommends the use of mercury to precede the employment of iodine, as the unloading the intestines, and the establishment of the intestinal secretions, greatly favor the operation of the latter on the system. All practical writers refer to the necessity of commencing the treatment of scrofula by cathartics, as recommended above.

In very irritable conditions of the system its use should be avoided, until some energy is restored to the organs by hygeinic measures. A removal to the country, or to the seaside in hot weather, together with the use of mild bitter infusions, will very naturally precede the employment of iodine, under the circumstances just mentioned.

It is usual to prescribe iodine in conjunction with the hydriodate of potash, the solubility of the former being augmented by this combination. The subjoined prescription is that employed by M. Lugol, and is preferred by him to the tincture of iodine, as a precipitate usually forms after it has remained for a short time, and water always causing a precipitate in the simple alcoholic tincture.* The formula of Lemasson, is also given below.†

Some will bear with advantage much stronger doses of iodine than that of M. Lugol, but it ought to be commenced in the minimum dose, and gradually increased. M. Baudelocque, commencing with the proportions similar to those above mentioned, increased it by degrees to six grains of the hydriodate of potash, and three grains of iodine daily.

In the use of this medicine the greatest precaution should be observed, and the dose should never be increased without carefully watching its effects; and upon the slightest appearance of nervous irritability, or derangement of the functions of the stomach, its use must be suspended. Among the unpleasant consequences occasionally resulting from the employment of iodine, are distressing pains in the chest and bowels, and in some, very severe convulsions. The permanent effects are palpitations, cough, debility, emaciation, wakefulness, trembling, headache, and tumefaction of the legs. When any untoward symptoms arise from iodine, mucilages of starch and anodynes, with emollient and anodyne enemata, will counteract them. The experience of physicians, generally, as to the proper time for giving iodine, is shortly after a meal; it is less apt to produce nausea at that time than when taken fasting. About an hour or two, therefore, after eating, appears to be the best time for giving it, and some have even recommended animal food as an adjuvant.

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* ℞ Iodini, gr. v.
Potass. Hydriod., ℈ss.
Aq. Destill., ℥ij.
Two drops twice a day to children under seven years, gradually increased to five drops. Sixteen drops will be the maximum dose for children above seven. To be given in sweetened water.

† ℞ Iodini, ℈j.
Potass. Hydriod., ℈ij.
Aquæ Destill., ℥j.
Contere Iod. et Potass. hydriod. in mortario, vitreo, sensim.
Aquæ Destill., et adde.
Four drops thrice a day, in a little sweetened water.

M. Lugol has strongly recommended ioduretted baths; but, from the rapid evaporation of the iodine, it is doubtful whether much benefit can arise from their use. The proportions used by him for children between the ages of four and seven years, is from thirty to thirty-six grains of iodine, and sixty to seventy grains of hydriodate of potash, to nine gallons and a half of water.

There have been a vast number of other articles used at different times in the general treatment of scrofula, from their real or supposed effects on the lymphatics, such as calamus, balsam of sulphur, iron, mezeron, sarsaparilla, etc.; and various narcotics have also been employed and lauded as specifics, as hyoscyamus, digitalis, solanum, asclepias, and some others; they, however, possess no other effects than as assistants to other and more rational means, for the purpose of allaying a morbid irritability.

With respect to the local measures to be used, these must, like others, be directed altogether by the condition of the part; if the tumors appear red, and possess much tenderness on touching them, leeches should be applied, and the inflammation subdued by the usual means. On no account must stimulant applications be made, in such a condition of the parts.

In general, however, there appears to be at the commencement a simple congestion of the gland by the lymph, and demands a local treatment corresponding with general measures. The peculiarly stimulating effects of iodine will, therefore, render it necessary to adopt it in connexion with the internal use of the same article.

When externally applied, it causes a yellowish stain on the skin. There is but little hazard in the use of it when externally employed, for as the part heals it becomes less sensible to its influence; and the evident disappearance of the tumor is a sufficient indication of the proper effects of iodine, in time to prevent any possible injury arising from its excessive employment.* Dr. Hildreth, in the American

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* ℞ Iodinii, gr. xij.
Potassæ Hydriod., ʒj.
Adipis, ℥j. M.

℞ Iodid. Plumb., ʒj.
Adipis, ℥j. M.

Journal of the Medical Sciences, for August, 1840, extols highly the iodo-hydrargyrate of potassium in glandular enlargements.[*]

Where the tumors break, they should for a short time be covered with a soft poultice; and when the discharge is somewhat abated, the application of stimulant lotions is in general indicated, as solutions of alum,[†] sulphate of zinc,[‡] or nitrate of silver.[‖] In very indolent conditions of the ulcers, great benefit is derived from a saturated solution of sulphate of zinc. A highly irritable state of the parts sometimes exists, which requires soothing applications and a poultice of hemlock, or a lotion made with the extract of conium will be peculiarly beneficial to allay this morbid irritability. If fungous excrescences arise, they should be removed with burnt alum or nitrate of silver; the latter, also, when applied to the edges of the indolent ulcer, greatly favors the establishment of a new action in the part, and is the best application of an escharotic nature that can be used, as it leaves but little irritation and inflammation. When any escharotics produce an increase of local excitement, it should be allayed by the application of poultices, and cataplasms of some mild narcotic.

The indolent and permanently-enlarged glands have been successfully treated by compression, care being taken not to apply it until the inflammation is removed. Scrofulous ulcerations, also, have been treated upon a similar plan, and the method of Mr. Baynton in treating ulcers on the legs, successfully used. After the ulcers are covered with simple dressings, a soft compress should be applied, and the whole bound closely by means of adhesive straps, where the situation of the ulcers will admit of it; about the neck, pressure should be avoided, over the pomum Adami, lest respiration should be affected.

TABES MESENTERICA.

This disease, known also by the names mesenteric scrofula, atrophia mesenterica, chronic mesenteritis, is more frequent in children about the period of weaning than in after life; if we except the time intervening between this period and the age of seven years. It has by some been confounded with remittent fever, which occurs in children, but the latter may exist without any affection of these glands; and the only resemblance between them is, that a deranged state of the chylopoetic organs exists, and that fever will in some stages of the disease attend it, and thus render it liable to be confounded with remittent fever.

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[*] ℞ Deutiodid. Hydrarg., gr. viij.
Hydr. Potass., ℈ij.
Axung., ℥j. M.
To be applied to the tumors, two or three times a day.

[†] ℞ Alumen., gr. v.
Solve in
Aquæ Ros., ℥j. M.

[‡] ℞ Zinci. Sulphat., gr. iij.
Aquæ, ℥iss. M.

[‖] ℞ Argenti Nitratis, gr. iij.
Aquæ Destill., ʒj.

The affection known as the disease of the mesenteric glands, and which consists in an enlargement of these bodies, accompanied with great emaciation and hectic fever, a peculiar form of chronic disease attendant on a strumous diathesis, is what is proposed to be considered under the present title. Some degree of inflammation attends it, chiefly during the progress or toward the termination of the affections; and although the acute inflammation and true suppuration of the part must be regarded as a distinct affection, yet in many instances the disease known as the tabes mesenterica may be greatly modified, and approach more closely to the ordinary action of inflammation, according as a less degree of the strumous diathesis is in the system, the complications in both being an inflammation of the mucous lining of the intestinal tube. The diagnosis is, under such circumstances, a secondary consideration, for the treatment will be similar in both, as the disease then assumes one of the forms of enteritis. When, from an accurate investigation of the case, we are satisfied that its slow progress, and the absence of fever at the commencement, give evidence of the non-inflammatory nature of the disease, it may then be referred to the development of a strumous affection, analogous to that already described. In this form of the disease the wasting away of the frame is an invariable occurrence, and hence the name tabes, which, although describing but a mere symptom, is yet an important and very striking designation of the disease.

ETIOLOGY.—Children of a strumous habit of body are those who are predisposed to enlargements and softening of the mesenteric glands, and indeed they are the glands where the scrofulous disease shows itself the soonest. Sir Astley Cooper remarks that they are, next to the cervical glands, the most liable to be affected with this disease; but according to the results of the investigations of the distinguished anatomist, Meckel, and of Andral, the latter undergo the changes which impart the peculiarities of scrofula sooner than any other part of the system.

It is unnecessary here to repeat the usual marks by which this predisposition may be suspected, as they have already been mentioned in the preceding section. That this condition of system exists in tabes mesenterica, has been the opinion of several writers, whose opportunities of examination have enabled them to discover, after death, the simultaneous existence of this disease and phthisis. Portal* and Guersent† have both found tubercles in the lungs of those that died with tabes mesenterica.

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[*] Sur La Phthisie de Naiss., Mem. de l'Acad. des Sciences, 1781.

[†] Dict. de Méd., art. Carreau.

It has been supposed that a prominent abdomen is an evidence of the predisposition to mesenteric affection; this, however, is not always to be regarded as a sign of the existence of the disease, even when it is developed, much less can it be regarded as a certain evidence of a predisposition to it. A full and prominent abdomen, when connected with other signs of a lymphatic temperament, point out the strumous diathesis, and may rationally lead to the suspicion of an enlargement of the mesenteric glands, when symptoms appear which are pathognomonic of the disease. As a sign of the predisposition to the disease, as remarked by Evanson and Maunsell, it has been greatly overrated, if, indeed, it possesses any: the mesenteric glands adding nothing to the size of the abdomen until the disease has advanced to some extent. This remark I have had some opportunities of verifying: and at the present time have a little patient who exhibits unequivocal symptoms of the existence of disease of the mesenteric glands from a scrofulous predisposition, without any inordinate size of the abdomen. Guersent* also positively asserts that extensive mesenteric disease has been found in instances which came under his notice, where, during life, no greater enlargement of the abdomen existed than is usual in children of the same age in health; and maintains that a large abdomen is no sign of the liability of the subject to this affection.

Besides the strumous predisposition, the active development of these glands, which is a gradual process from birth to the period of teething, renders them liable to take on diseased action. Accordingly, at the time when the entire digestive system undergoes a change, and all the glandular apparatus immediately connected with the process of digestion is excited to an increase of its natural functions from the requisitions of the system for a different species of food, these glands, with others, exercise a great increase of their natural actions. The most accurate observers have noticed that the disease, for the most part, makes its appearance about the eighth month, to a year.† The development, therefore, of the mesenteric glands, like that of other parts of the system, gives a very strong predisposition to disease, easily excited on the application of the usual causes.

The exciting causes are those which have already been enumerated, as producing a congestion and enlargement of the lymphatic glands; such as insalubrious air, deficient exercise, but more particularly improper food, and the change occurring in the diet at the time of weaning. This latter is a very common cause, where, from the inability of the mother to nurse her offspring, it is necessarily weaned before the proper period, while artificial food is substituted for the breast milk.

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* Dict. de Méd. art., Carreau.

† Andral, Path. Anat., vol. ii., p. 448.

As was remarked when treating of scrofula, diet itself is not so invariably a cause of mesenteric disease as it would generally be supposed; but when to impoverished diet are added the baneful effects of bad air and crowded habitations, this disease is most apt to make its appearance. The most common cause in dietetics is not so much, perhaps, a poor or vegetable diet, as food that is altogether inappropriate, such as the too early or too frequent use of animal food, broths, &c.

The inflammation of the intestinal mucous membrane is considered as the principal, if not the sole cause of enlarged and diseased mesenteric glands, by many pathologists of the present day. Dr. Cheyne, in his valuable work on the abdominal diseases of children, observed that this was a frequent cause of the diseased glands—an important fact to recollect in the treatment of the affection, the nature of the exciting cause having a direct bearing on the treatment. The disease, when produced in this manner, is usually marked by symptoms which indicate the presence of an inflammation more or less severe from the commencement, and will therefore come under the notice of the physician as a disease at first differing from that now under consideration, and leading to it as a result or consequence.

Besides, therefore, the non-inflammatory development of tabes, any of the causes which will produce enteritis, or cause an irritation in the mucous membrane of the intestines, may become a source of enteritis. The retrocession of cutaneous eruptions may consequently produce this disease, as this frequently excites inflammation of the mucous lining of the bowels.

Semeiology.—It is extremely difficult, by any precise signs, to detect at first the existence of enlarged mesenteric glands; all the varying symptoms of gastric and intestinal indigestion and inflammation being more or less evident, and are the necessary attendants on the disease of these glands when they exhibit any symptoms of disorder; for there have occurred cases where they have been found in a state of suppuration, without any suspicion of such disease existing.

The commencement of the disease is exceedingly obscure; and the only cause of suspicion is found in the existence of a strumous diathesis, and the appearance of scrofulous enlargements about the neck, while the obstinacy of the symptoms of disordered digestion, and their repeated occurrence, will almost confirm the suspicion that the mesenteric glands are likewise the seat of the chronic engorgements, to which they, in common with the lymphatic glands, are liable.

The affection has been divided into three distinct stages: the first, as has just been observed, being very difficult to distinguish.

This division is generally adopted by practical writers, although, like all other arbitrary divisions of disease, it is at times very difficult accurately to distinguish. The following are the symptoms which have been assigned to each of these stages by Capuron, Gardien, and other writers, and which in the last two stages may easily be recognised.*

At first the child loses its ordinary vivacity, becomes sad, pale, and feeble. The digestion is deranged, the appetite nearly lost, the abdomen appears flatulent, swelled, and tense, more especially toward night. The alvine evacuations are occasionally liquid, with intervals of costiveness. The lungs exhale an acid odor; respiration is irregular, and the pulse intermittent. The urine appears white and milky. Cramps sometimes occur in the limbs, which become very feeble. The face is thin and wrinkled, and the skin is dry and harsh. All these symptoms, it is very evident, are common to the ordinary gastric and intestinal derangements.

The second stage, in which the peculiarities of the disease are more evident, may be known by the variable appetite; usually, however, it is exceedingly voracious, without any improvement in the appearance of the child, who continues to become greatly emaciated. The food taken appears to cause distress; producing borborygmus, and other symptoms, caused by an inordinate mass of undigested matter in the bowels. The abdomen is largely distended, and it is at this stage of the disease that the indurated glands may be felt, solid, knotty, and isolated: the only symptom on which M. Guersent relies, as an unequivocal evidence of the existence of tabes mesenterica.

When an examination of the abdomen is made for the purpose of ascertaining the existence of these diseased glands, it should be done while the bowels are empty, when the glands may be felt, and giving pain on pressure. The pain is only felt when the glands themselves are pressed. This is a diagnostic sign of some importance, for there is evidently but little or no inflammation of the intestines when no pain is produced on pressing the abdomen in the usual manner.

It has been observed that the pain of simple strumous mesenteric glands is not increased by pressure on the abdomen; they can not therefore be always complicated with a phlogosed state of the intestines. When the child is old enough to give an account of the pain attending the disease, it is described as sharp and deep-seated, not continued, but recurring at intervals like the griping pain of colic, but situated more toward the loins.

In this stage the urine flows in small quantities. The stools are very irregular, and occasionally altogether suspended; sometimes they are soft, and present a very natural appearance; at other times, and much more frequently, they are of a white or chalky appearance, which has been regarded as peculiar to this disease. Worms are often found in the alvine discharges.

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* Traité des Mal. des Enf., par J. Capuron, p. 416. Dict. des Scien. Méd., art. Mal. des Enf.

The body becomes exceedingly emaciated, the face pale, and the features sharp, while the abdomen gradually changes. In this stage a fever of a very irregular type makes its appearance. It is at first obscure and intermittent, but if the disease is attended with inflammation of the mucous coat of the intestines, it becomes more distinct and acute, but for the most part assumes the remittent form. When it is simply the effect of irritation caused by the preternaturally enlarged glands, its exacerbation occurs toward evening, accompanied with great restlessness and a rapid pulse, beating from 120 to 130 in a minute. This fever is preceded by severe chills, and ends in profuse sweating, with colliquative diarrhœa; it is a true hectic fever, the paroxsyms terminate toward morning, to be renewed at the close of the day. There is but little disturbance of the intellectual faculties; and listlessness and indifference to surrounding objects, and avoidance of all exertion, are the principal manifestations of any change in the sensorial powers.

In this stage, also, it is not unusual for anasarca to take place, if the tumors are large, from their pressure on the veins. From the same cause, also, a change occurs in the functions of contiguous parts, and the actions of the stomach, liver, and kidneys, are very materially impaired.

During the entire progress of the disease, but more especially at the period designated as its second stage, a variation of the symptoms will be observed in different cases, according to the complication of the mesenteric affection, with phlogosis of the intestines. When the disease of these glands exists independently of any such complication, or when the latter is very light, the accompanying fever bears little or no resemblance to the remittent fever of infants, which is its character when the inflammation of the mucous membrane of the intestines is severe. A close attention to the symptoms, principally by examining the condition of the abdomen on pressure, will sufficiently enable the physician to detect the evidences of inflammation of the bowels. When this exists, the disease is usually rapid in its progress, and differs in no respect, in its manifestations and results, from enteritis.

In the last stage, this inflammation almost invariably exists, even if it should have been absent at the other periods of the disease. The glands have passed from their indurated condition, and become softened or suppurated. The fever is decidedly hectic, and great prostration of strength ensues, with extreme emaciation. Excessive discharges by stool take place, and pus, mixed with streaks of blood, appear in the alvine evacuations. The abdomen becomes more tumid and tender to the touch, serous effusions in the cellular tissue and peritoneal cavity increase, and the child dies in a state of complete marasmus.

It is a subject of acknowledged difficulty, accurately to distinguish this disease from others which affect the abdominal organs of children. One of the most unequivocal signs of the presence of enlarged mesenteric glands, is the existence at the same time of scrofulous tumors in other parts of the body, while the symptoms above mentioned show the disordered state of the primæ viæ. Where these signs also are absent, the tubercular affection of the mesenteric glands may be suspected, when the child exhibits the usual appearance of a scrofulous habit; while fever, which usually attends gastro-intestinal inflammation, is absent. The nature of the alvine discharges, in connexion with other symptoms, will throw some light on the nature of the disease. If there exist a diarrhœa, the food taken appears for the most part to excite it; and the crude nature of the evacuations will show that it has been rapidly urged through the bowels, from an exalted action, produced by the increased susceptibility to impressions, which follow an inflammatory excitement. The stools, also, have a mucous or slimy appearance, showing an alteration in the secretions of the mucous surface. The pain will, for the most part, be increased immediately on taking food, when there is any gastro-intestinal inflammation; and where there is inflammation, especially of the small intestines, pain will immediately be increased on pressure. The discharges, on the contrary, in the scrofulous affection, commencing in its ordinary manner, although there may appear in them ill-digested food, are yet destitute of the morbid secretions which attend inflammation of the mucous membrane.

All the symptoms of an abdominal nature are equivocal; but when they present a deranged condition, and the child has the usual symptoms of a scrofulous diathesis, and with them continues to grow emaciated, while the appetite is good, or perhaps voracious, the strong presumption is, that the mesenteric disease is the cause of all the untoward symptoms.

Morbid Anatomy and Pathology.—On a post-mortem examination, the exterior of the body presents a rough and ashy appearance, the skin is dry, and from the great emaciation of the body, seems almost in some parts closely adherent to the bones. On opening the body the mesentery is found often infiltrated with pus, and studded with engorged and tuberculated tumors, in various states of disorganization; some partially suppurated, and others totally destroyed. Those which are in the earliest stage are red, and somewhat increased in size. These glands and tumors are of various sizes, from that of a pea to that of a hen's egg. They are often agglomerated into masses of great size; and those which are advanced to the second stage of disorganization, are of a dull, white color, and firm consistence. The glandular structure of the mesenteric glands is at times found entirely altered, and tubercular matter deposited in its place. This tubercular deposite also appears on the surface of the glands, which gives them the appearance of being much enlarged; but, according to Andral, it is not so, but it is the effect of the additional deposite of tubercular matter, commencing either in the centre, or in several points of their bodies. It has been supposed to occur in the cellular tissue; for injections show that the permeability of the lymphatic vessels, through the glands, remains the same as if there were no disease, for injections readily pass through them.

These tumors, when softened, exhibit precisely the same characters as tubercular matter in other parts, the caseous appearance being in every respect like that observed in tubercular matter of the lungs in phthisis. Besides these lesions in the part which is the immediate seat of the disease, various others are occasionally found. The peritoneum is sometimes inflamed, with adhesions and effusions in its cavity. Appearances of inflammation also have been found in various parts of the intestines, with ulcerations of the mucous surface. These, it has been remarked by some observers, are not uniformly the case in enlargements of the mesenteric glands, and their existence is as frequent without a diseased condition of the glands, and they have no dependance on each other, as cause and effect, notwithstanding that this theory has had such strong advocates.* The analogy offered by the enlargement of the cervical lymphatic ganglia by a primary affection, without being traceable to an abnormal condition of the adjacent parts, with which it is connected, shows conclusively that an independent disease can exist in them.

It is very rare that there are not found tubercles in other parts; the liver generally contains some, and they are also found on the peritoneum. The greatest number exists in the lungs, as we learn from the dissections made by Guersent, in the Children's Hospital at Paris.†

The disease is then of a scrofulous nature, depending for the peculiarities of its manifestations on the development of the strumous changes in the mesenteric glands and the adjacent parts, and analogous in every respect to similar alterations in other glands and tissues. Like most diseases, it scarcely ever exists without its complications. It is from this cause that much diversity of opinion has prevailed as to its precise nature; for diseases affecting the primæ viæ of children are much more liable to the admixture of other derangements, as one part can hardly ever be affected without other portions being likewise disturbed in their functions, or suffering perhaps from organic changes. Inflammation not only occurs in the mucous membrane of the bowels, but traces of it are found in the peritoneum, and tubercles are discovered both in this serous membrane and in the liver. The complications are important in a practical point of view; and the early appearance of inflammation appears to demand a course of treatment which the judicious physician would hesitate to adopt, under circumstances which exhibit at once a tendency to the fatal debility and marasmus which characterize the disease in question.

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* Dr. Joy, Cyclop. Prac. Med., art. Tabes Mesenterica.

† Loc. Cit.

It has been common, since the doctrines of Broussais have been introduced, to regard the disease in every instance, as produced by an inflammation of the mucous membrane of the intestines. Tubercular matter is now regarded as a distinct morbid product, and the mesenteric glands may become tuberculated like other glands; and this change is accompanied with inflammation at some period of the disease, but is not necessarily preceded by it. That these glands become inflamed and suppurate, from the cause just mentioned, no one can deny; for there is no reason why we should question the analogy between them and other glands, as those of the groin, which it is well known become inflamed, and suppurate from transmitted continuous inflammation. But such is evidently not the disease in question, for it is one purely of a tubercular nature: it has been regarded as such by Bichat,* Sir A. Cooper,† Andral,‡ Carswell,‖ and others. It may be generated in the part itself, without being transmitted from another. Whatever be the theory of the actual development, it would appear, from its nature, to be capable of being excited into action, in a manner different from that of ordinary inflammation and suppuration, and not necessarily dependant first on an inflammation of the mucous membrane. Such inflammation as we see in other glands, results, for the most part, in real genuine suppuration. There exists in these, as in other glands, a real inflammatory enlargement, which follows inflammation of the bowels, and which may be an attendant of the remittent febrile affection of children. This distinct disease has been described by Pemberton; and although an enlarged condition of the glands was found, yet it was destitute of the peculiar cheesy matter existing in tuberculated glands. It is, he says, an enlargement from the irritated and inflamed membrane with which they are surrounded.*

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* Anat. Patholog. d'apres un manuscrit autographe, etc., P. A. Béclard.
† Lancet, vol. iv., p. 102.
‡ Morbid Anat., p. 209.
‖ Path. Anat., fasic. iv.; Lond., 1834.

As was before remarked, the disease is rarely found uncomplicated with irritation, inflammation, and at times even ulceration of the mucous lining of the intestines. This inflammation in those of a scrofulous habit is liable to run into tabes, and the disease thus produced is very easily confounded with the simple ordinary inflammation, excited in the same manner. Inflammation, both in the glands and in other parts, is also influenced by the amount of the strumous diathesis developed in the system, and like other forms of scrofula, will be modified in its appearance and progress by this condition of the system.

TREATMENT.—The treatment must be, as to the general principles, similar to that pointed out for the management of scrofula. It will, therefore, be necessary to adopt similar hygeinic rules, and to give the patient, if possible, the benefit of good free air in a healthy district of country, and by good nourishing food and plenty of exercise, suited to the age and vigor of the child, give the constitution an opportunity of attaining a state of healthy development. It is unnecessary here to repeat what has been already said on this subject. The remarks under the head of scrofula are applicable to the present disease; bearing in mind that the seat of the affection, and the great liability to complication by inflammation of the mucous surface of the bowels, render great circumspection necessary in the use of stimulating or nutritious food.

It will be of the greatest importance in the treatment of this disease, throughout all its stages, to recollect the frequent liability to an inflammatory action in the mucous membrane; and to examine closely at the first appearance of disease, attended with derangement in the actions of the chylopoetic viscera, whether there do not exist some degree of inflammation in these parts, or their dependant membranes, and other organs with which they are connected. When these are found to exist, the treatment should be commenced with the abstraction of blood, by means of leeches applied to the surface of the abdomen, and the use of warm fomentations, warm bath, and frictions over the surface of the body. Such measures will form a powerful counter-irritation to the disease, even if there should not be inflammation decidedly manifested by tenderness on pressure, but only symptoms of evident derangement of the abdominal organs, which would lead us to suspect the presence of diseased glands, and if much febrile action attends the other symptoms. This course will be more beneficial at the commencement of the disease, before debility or emaciation has ensued. Indeed, it is scarcely applicable at any other period, for the child can rarely ever bear the repetition of the abstraction of blood, without serious debility being the result, when the glands are the seat of the scrofulous affection. The local inflammation and irritation most commonly exist, to a greater or less degree, in all these affections at first; and it is not incompatible to resort to these measures for its removal, while efforts are at the same time made to invigorate the general system, principally by the measures already mentioned. To tell the precise point when measures of a local depletory nature ought to be suspended, is sometimes a question of great difficulty, especially in the disease before us. That it can not be pursued, and the treatment mainly conducted on the supposition that it is essentially inflammatory, all experience fully justifies.

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* A Practical Treatise on the Various Diseases of the Abdom. Viscera, by C. R. Pemberton, M. D.; Lond., p. 17.

It is also a safe practice, and one which is borne out by experience, to use mild aperients where the bowels are sluggish in their action; that of calomel and rhubarb will be decidedly the best: the former, from its well-known action on the secretions generally, and the latter, from its property of controlling excessive discharges. Purgatives were formerly very much in use in the treatment of this disease; of late they have been almost entirely discarded, and nothing allowed to pass to the internal surface of the bowels but the blandest substances. Although, when injudiciously used, they unquestionably greatly aggravate irritation in the mucous surface of the bowels, yet daily observation proves, also, that by their effects on the secretions they also relieve inflammation in the very parts where they exert their irritating properties. Besides, in this disease, and in all affecting the chylopoetic viscera, we are not certain that the mucous membrane always continues inflamed throughout its whole process, even if it were so at the commencement.

An altered condition of the secretions of the liver and intestines, known by a foul tongue, and dark-colored discharges, highly offensive in their character, will, for the most part, indicate the necessity of aperient medicines. The relief afforded to the vessels by the free secretions, produced by medicines of this nature, will not only tend to relieve the local affection, but will likewise impart an increased vigor to the constitution. The indiscriminate and persevering use of cathartics has brought remedies of this nature too much in disuse, especially where the viscera of the abdomen are implicated in the disease; but under the circumstances just named, those of a mild character, and which exert their principal effects on the liver, will be such as will be needed. When these are indicated, calomel should have the decided preference, and, as before remarked, will be best combined with rhubarb; or a small dose of calomel at night, followed by a combination of rhubarb and sulphate of potash on the following morning. This course should be adopted for a week or two, intermitting every third day, until a decided improvement is seen in the alvine discharges. It has been the custom in Europe to administer at the same time some mild, bitter infusion, combined with a narcotic, for the purpose of procuring a tonic effect, and allaying constitutional irritation. These means may advantageously be adopted where there is no fever present, or any mark of inflammation. Such cases will sometimes occur, and be decidedly benefited by this course.

A combination of these means is recommended by Underwood, who, after using small doses of calomel two or three times a week, advises the sub-carbonate of soda on the succeeding day, or an infusion of senna and burnt sponge, with which he was almost certain of effecting a cure—regarding the purgative system as the most essential to the cure of this dangerous disease, and even to be used when there is a loose state of the bowels. After the bowels had been thus freely acted on, he then combined small doses of calomel with ipecacuanha, cicuta, and colombo.

All practitioners agree as to the beneficial effects of mercury in some form, given only to influence the secretions, but not to produce salivations. Lloyd, for this purpose, recommends blue pill, or Plummer's pill, followed by a decoction of sarsaparilla. Abernethy uses mercury, combined with rhubarb and ginger, for the purpose of restoring the secretions and imparting tone to the stomach, and thus improving the digestive organs. All these various combinations may be found useful, and the union of a tonic with an aperient, even immediately after local depletion, may in reality be found useful practice; for a local affection, like that now under consideration, will not be found to be aggravated by the increased vigor imparted to the constitution by a mild tonic and improved digestion. The form of mercury, which is generally the most useful in the deranged secretions in children, and especially if accompanied with any degree of looseness, is the hydrargyrum cum cretâ, combined with rhubarb. Formulæ, which are applicable to the present disease, have already been given. Whatever be the form in which this medicine is given, it should never be carried so far as to affect the constitution. Frictions, therefore, of mercurial ointment, which for a time were much in use, are inadmissible in this disease, for they produce no action on the system until absorbed, when the constitutional effects will produce very serious consequences in a strumous habit. It can only be given with safety in such quantities as will procure an increased secretion from the liver and intestinal surface.

Where there exist good reasons for not using calomel, rhubarb, combined with sub-carbonate of potash, or sulphate of potash, will be found useful, from its mildness, and may be employed daily, for some weeks, where purging is deemed necessary. A most important means should not be overlooked in the management of this disease, that is, the employment of frictions and external stimulants throughout the whole course of the disease. This method of treating chronic affections is too much neglected; but it is among the most useful which can be adopted, for it not only produces a counter-irritation, but, by the active influence on the capillary system of the surface, powerfully excites it into action, and thus produces a constitutional effect on the capillary system generally, from the extensive sympathy which exists with the vessels and nerves of the dermoid surface. The body and limbs may be frequently rubbed with some stimulating liniment, while the ointment of iodine, which exerts so powerful an influence over the glandular system, may be rubbed over the abdomen twice a day. The ointment of the hydriodate of lead is considered as preferable, on account of its not causing so great an irritation on the surface to which it is applied as other forms of iodine. Formulæ for applications of this nature have already been given under the head of scrofula.

It was before observed that tonics are at times called for in the treatment of this disease. They were much more freely used in former times than at the present day; but while they were formerly too indiscriminately resorted to in the early stages of the disease, and greatly relied on for its cure, they have been too much disregarded in the present day. Whenever tonics, whose action is direct on the digestive functions, are used, they ought always to be combined with some aperient medicine, whereby the secretions are excited, while a vigor is imparted to the digestive organs. When such are deemed necessary, which can only be the case when there is an entire absence of all febrile action, the sub-carbonate of iron, combined with rhubarb and colombo, is one of the principal means employed by Sir Astley Cooper in the treatment of scrofulous diseases generally. With respect to the employment of iron, it is only useful in cases of extreme debility and a leucopathic state of the system, where the serous fluids predominate. In such cases, after the employment of a proper alterative course, and when there is evidently a great want of tone, iron may be useful in overcoming the glandular obstructions, by the energy and vigor it imparts to the circulation. Notwithstanding its recommendation from high authority, it should be given to children with great circumspection, as it is a powerful excitant, and only under the circumstances just mentioned can it be considered as useful. Chalybeate mineral waters have also been found greatly to benefit those suffering from this, as well as other forms of scrofulous diseases, but they are not to be used when there is any inflammation of the glands, or of the intestinal or gastric mucous membrane. They should never be resorted to when there is any indication of such irritation with febrile action.

As a tonic and deobstruent the muriate of barytes has for a long time been held in high repute in Europe. Its value has probably been highly overrated, as it is now very generally abandoned. Dr. Ferriar, some years since, made several experiments with this medicine without finding the benefits he anticipated from its use, as it failed in the greatest number of instances. Although in more recent times it has been advocated by some French practitioners, yet the hazards attending its use far overbalance the advantages. Very alarming effects sometimes follow its employment, such as colic, hypercatharsis, vertigo, inflammation of the mucous lining of the throat, stomach, and intestines; and even death has ensued, where its proper dose has been a little exceeded.

Since the powerful effects of iodine have been known, it is the principal, if not the sole tonic on which reliance has been placed, in the treatment of this and other scrofulous affections, although in the mesenteric disease experience has not so fully proved its efficacy as in other forms of the scrofula. The objections to its use have been, that it so easily excites the mucous membrane of the intestines to inflammation, and aggravates it when such a condition exists. The form in which it has been found most beneficial is that of the tincture of the hydriodate of potash, in doses of from five to ten drops, to young children, as already mentioned, when speaking of scrofula. Guersent, on the contrary, says it is totally inefficient in the affections of the mesenteric glands; with the remark, that it is to be more cautiously used, from the fact that an active inflammatory state of the bowels may be more easily induced in this than in other forms of scrofula. The observations already made on this subject in the preceding article, will be applicable to the present disease.

RICKETS.

The name rickets is derived, it is said, from the Greek word ραχὶς, the spine, from the curvature of this part of the body. Dr. Good, however, doubts this etymology, believing that, as the disease was first observed in England, it received its name from the Saxon *rick* or *ricg*, signifying a hump. This idea is the most probable, as the Greek term is not to be found in any of the Greek or Roman medical works.

It has been supposed that this, in common with other diseases, must have existed among the ancients, but there does not appear any description corresponding with this affection in any of the writings of the early period of medicine. Hippocrates contains no account of it as a distinct affection. It was probably confounded with some other disease, since we can scarcely doubt its existence. Homer describes the deformed and hunch-backed Grecian, Thersites, in his account of the siege of Troy. And the no less celebrated Tyrtæus, the poet, of whom Horace speaks, was sent in derision to the Lacedemonians, when the oracle promised success to the arms of the latter on their obtaining a celebrated general from Athens. Other allusions exist in various ancient authors in relation to deformed persons, which prove a disorder of the osseous system, corresponding with that now known as the rickets.

The earliest description of the disease was given by Glisson, in 1650. He states that it first appeared in England, in 1620, whence it spread over Europe.*

Etiology.—This disease may be developed at all ages, but children are most predisposed to it. Some have asserted that it is never formed until after birth, and others have stated that it does not make its appearance until the age of two or three years; but Pinel has dissected a fœtus, and preserved the skeleton, in which the disease was fully developed.† Children, at all ages, are far more subject to the disease than adults; and from its being also found in the fœtus, is one of the evidences of the influence of the development of the body in the formation of disease. The subject will again be referred to, under the head of the pathology of rickets.

It has been supposed to be contagious, but there exists no proof of its propagation in this manner; the idea has probably arisen from its being one of the complications of scurvy, scrofula, and syphilis. Although not contagious, it appears to be hereditary, like other diseases affecting the nourishment of the body.

With respect to the exciting causes, some have denied their existence altogether, and assert that it arises spontaneously from a simple natural impulse. But most practitioners are of a different opinion, and refer the formation of the disease to the action of various causes acting on the hereditary predisposition. These are chiefly such as tend to produce a debilitating effect on the general system, as impure and confined air, that is rarely exposed to the influence of the sun, and is consequently loaded with moisture. It is peculiar, also, to some climates, and prevails more in the valleys of the Pyrennean mountains, than it does, from all the accounts we receive at the present time, in Great Britain. It has also been found in Chinese Tartary. Although occasionally seen in the United States, it may be considered as of rare occurrence. With these may also be classed the want of nutritious food and regular exercise, and the absence of cleanliness, so common among the poor.

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* De Rachiti de sive Morbo Puerili Tractus; Lond. 1650.

† Capuron, Malad. des Enf., p. 421.

In some instances, however, there appears to exist no actual cause for its appearance, other than the natural process of development, with an imperfect supply of the proper materials for the growth of the osseous system. It has occurred in families where everything necessary to comfort and health existed; one child, perhaps, out of several, exhibiting the morbid development of the bones.

In those of a scrofulous diathesis, an injury done to the bone by changing the vital action of the part, has produced the disease. An example of this is given by Chaussier, in the case of a man thirty years of age, who received a violent blow on one of the parietal bones; and also of the alteration in the bones of the carpus, from a severe fall on the part.

Other causes have been charged with the production of the disease; as the presence of worms, acidity of the stomach, dentition, etc.; but these are probably only accompanying affections, aggravating the existing disorder.

Semeiology.—The progress of the disease is very gradual, and almost imperceptible at its commencement. The skin is soft and flaccid, and the complexion fair and delicate, while a general appearance of debility occurs. The child is indifferent to occupation of any kind, and languid; and being indisposed to exert his limbs, lies for the most part in bed. The digestion is evidently deranged, as appears from the acid odor of the breath, and the irregularity of the stools.

The head is the first which exhibits the effects of the diseased condition of the osseous system; not only in its enlarged size, but also in the separate state of the sutures. The neck at the same time becomes slender and flexible, while the jugulars appear more prominent.

If the disease be not arrested at this period, the epiphysis of the bones appear more enlarged than in a healthy state, while the limbs themselves, from the emaciation, are much smaller. The sternum becomes softened and convex, and the ribs flattened, while their articulating extremities are increased in size. All the bones are softened, the limbs are unable to support the body, and the spine becomes distorted. If the disease continue, the pelvis, also, is softened and crooked, materially impeding the action of the bowels.

The progress of the disease is not confined to the bones solely, for in very severe cases the liver, spleen, and mesenteric glands, become tuberculated; hydrocephalus, hydrothorax, and acites, take place, and the child, at same time being greatly emaciated, presents a hideous spectacle of deformity. A colliquitive diarrhœa ensues, which soon terminates in death.

These extreme symptoms are rare among the native inhabitants of the United States, but may at times be seen in some of the wretchedly indigent immigrants arriving on our shores.

PATHOLOGY.—A marked deficiency of earthy matter in the bones, which is diminished about one half, characterizes the disease. It is usually connected with other evidences of scrofula, and, consequently, the two diseases are essentially the same, but manifested in different parts of the system. They both depend on the supply of imperfectly-elaborated materials for the proper and healthy growth of the body. The different ages at which the various forms of scrofulous diseases appear, afford a remarkable illustration of the predisposition to disease from development. The tubercular disease of the lungs rarely appears before the age of puberty, for these parts undergo but little change from their state as it exists immediately after birth. Their condition appears to vary but little at any age, and therefore they are not liable to those alterations with which they are so often affected, until the period of puberty, when changes occur in the vocal organs, or the repeated exposure to other exciting causes develop the latent disease. Again, scrofulous disease, properly so called, which is manifested in the enlargement and alteration of the lymphatic glands, appears at an earlier period of life, while the demand for nutrition keeps the lymphatic system in a state of preponderance. At this early period, also, the scrofulous diathesis will be exhibited in the ultimate tissue, the seat of interstitial growth, in those parts which undergo great changes in their structure during their growth. The bones, therefore, will soon manifest this, inasmuch as they are, at first, nearly cartilaginous, and requiring a continual deposite of earthy material in increased proportions; a defect in the supply, or in the proper elaboration of the materials supplied, is soon manifested in an imperfect development of the bones, constituting the disease in question. The growth of the bones, therefore, requiring, as they do, a supply of different materials, and the defect of the proper nutrition from constitutional causes, exhibit the predisposition to disease during the changes attendant on growth.

TREATMENT.—There is but little to add on this subject to what has already been said when speaking of scrofula. As debility and languor characterize the disease, every attention should be bestowed on invigorating the system, principally by means of exercise, pure air, and a good and substantial diet.

In order to relieve the head from the supposed engorgement, it was formerly the practice, from the recommendation of Glisson, whose work is remarkable for its accuracy in the account of the disease, to cauterize the part between the second and third cervical vertebræ. But this remedy appears to be not only useless, but injurious, in a disease independent of any internal congestion, and where continual and increasing debility is one of the essential symptoms.

Among the remedies which have been long in use, and which was so indiscriminately employed in children, both in sickness and health, in former times, is the cold bath; a remedy strenuously urged by Floyer, but whose partiality for it has led to its too general employment in young children, where the abstraction of heat is often attended with great danger to their lives. In rickets, which is characterized by a general debility, the good effects of cold bathing are evident in the increased energies of the nervous and circulatory system. Sea-bathing has the advantage of the tonic effects of the salts in solution, on the cutaneous vessels, and the stimulating effects of the cold water. Whenever a child is to be submitted to the influence of cold bathing, it should be done by gradually accustoming it to an increase of temperature, commencing with tepid water. After being immersed in the bath, the surface of the body should be wiped dry, and the child wrapped in flannel, and, as soon as dressed, should be allowed to take freely such exercise as it is capable of using. The child may also in the same manner be accustomed to cold effusions, which may be employed with perfect safety, if caution is at first used to have tepid water, and gradually lessening its temperature. Frictions are of great service after removal from the bath, and should in every instance be employed.

A vast number of remedies have been used at different times; it is unnecessary to mention them, for the principles of the treatment will be found in the preceding article on scrofula. The different preparations of iron are useful in these derangements of the digestive organs which require tonics. The attempt to supply the deficiency of phosphate of lime, by administering this substance, has never been followed by the anticipated success. The treatment, therefore, must be based upon the necessity of invigorating the system; and when it becomes necessary to use tonics internally, those must be selected which produce the least irritability. Iron, as recommended by Boyle and Cullen, is the best for this purpose. In rickets, therefore, after a preliminary aperient course, and the adoption of the obvious hygienic measures, if the disease still persists with evident debility and a leucophlegmatic state of the system, iron, by imparting energy to the system, will exert a salutary agency. Iron filings may be given where chalybeates are indicated, in the dose of half a grain to two grains three times a day to children under two years, and from two to five grains to children between the ages of two and four.* Iodide of iron is one of the most valuable preparations, and is peculiarly applicable to this disease.

Unless the affection is local, no advantage can arise from the application of any mechanical contrivance for the support of any part of the body, as pressure must be made on some other part, all the bones being in a pliant and flexible condition; and while one part may be benefited, another will be rendered more deformed by the pressure; besides the impossibility then existing of the child's using any exercise, so important in restoring the energies of the system. The greatest danger, during the progress of the disease, is the deformity of the thorax, which becomes convex anteriorly and flattened on the sides. By gently compressing the sternum as recommended by Dupuytren, this deformity may be removed during convalescence. It should be done daily with the hand; and the serious interruption which would otherwise occur to the proper motions and expansions of the lungs in after life will thus be obviated.

The bed on which the child lies should be moderately incompressible. A hair mattress is the best; and if unable to walk, he should be carried or ridden on one, to obtain the necessary exposure to the air, as the ordinary method of carrying can scarcely, if ever, be adopted in a bad case of this disease, where all the bones participate in the morbid changes. Where the child is old enough, all reasonable measures should be adopted to encourage gymnastic exercises, as a means not only of invigorating the general system, but also of preserving the symmetry of the limbs.

INCONTINENCE OF URINE.

This is an affection of very frequent occurrence in children at all ages, even until the period of puberty. It affects children of both sexes, but it is said that girls are more subject to it than boys. It is one of great annoyance, and when very frequent and continued, is a symptom of general derangement of the system, and is accompanied with other evidences of debility and disorder of the body, such as indigestion, emaciation, etc.

Etiology.—A most common cause is the natural irritability of the bladder, which appears to exist in infants, and the want of voluntary power over the sphincter. The habit, also, which the child acquires, of exercising no control over this evacuation, is also a cause of its continuance for some years. This habit is promoted by the natural indolence of some children, who will not rise at night to relieve themselves when urged by the promptings of nature. Among the other causes producing an involuntary flow of urine, is the profound sleep of children, which prevents the stimulus of the urine on the mucous coat of the bladder from being felt.

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* ℞ Ferri. Rament., gr. iij.
Cretæ, p. p.
Oleo. Sacchar. Citr., āā. ʒss. M.
ft. Pulvis. divid. in vi.
partes œquales.
One powder twice a day.

℞ Ferri. Rament.,
Pulv. Rhei.,
" Cinnamon. āā. gr. ij.
Magn. Carb., gr. ij.
Sacchar. Albi., ℈ss. M.
ft. Pulv. dent. tal.
Dos. No. vi.
A powder night and morning.

This disease exists in different degrees, for while some experience it only at night, others are affected during the day as well as at night. Those who are affected with eneuresis generally have frequent calls to evacuate the bladder at all times. The urine is more copious; and this increased secretion is the cause of the demand being so frequently made for its discharge. The origin, therefore, of the disorder, appears to be in the secretory function, and arises from a derangement in the action of the kidneys.

SEMEIOLOGY.—When the affection is long continued, and the discharge very frequent, the general health of the child is apt to suffer. He becomes emaciated, and loses his strength; but as age advances, the natural strength improves, the untoward symptoms gradually disappear, and the voluntary control over the sphincter of the bladder is acquired. At the period of puberty the incontinence of urine generally disappears without the interference of art. When it appears to depend on an hereditary condition of the nervous system, which is often manifested by a great irritability, it has occasionally lasted beyond puberty—the child, on being frightened, losing his control over the bladder. When at other times it has been relieved, it has again made its appearance on the development of the organs of generation, both of the male and female, when the latter takes place with more than ordinary vigor. This renewal of the disease renders it one of great obstinacy, and very difficult of management.

TREATMENT.—The causes of this affection must be the guide for the treatment, which ought accordingly to vary in different cases. In those arising from continuance of a bad habit contracted at an early period of life, the chief means must be directed to correcting it, by accustoming the child to arise once or twice during the night, while all late suppers are to be avoided. A great variety of means has been used at different times for the relief of the nocturnal eneuresis of children, each of which, although considered as infallible at the time, has been obliged to give place to others of no greater efficacy. It is of importance to find some remedy for this distressing complaint; for although of itself it may not be one of hazard to the future health or life of the child, yet, from the shame attached to it, and the means often resorted to, by unreflecting persons, to break the habit by severe chastisement or ridicule, a serious effect may often be made on the temper and morals of the sufferer. It has been attempted to be cured by the position in bed, and Sir Charles Bell has asserted, that the urine is only voided by children when lying on the back; and that a cure may be effected by altering the position of the child in bed, and causing him to lie on the side or face. This, however, does not appear to be the case; besides the great difficulty of preserving children in this position, which must almost preclude the possibility of relying on this method of cure.

As the disease evidently depends on the increased secretions of urine, such remedies as experience has discovered, to control this increased action of the function of the kidneys, must be resorted to for its relief. These are medicines possessing a sedative nature, combined with a tonic. An infusion of colombo root, with a drop or two of tincture of opium added to each dose, according to the age of the child, will be a useful means of controlling the increased action of the kidneys. There is always more or less want of vigor in the digestive organs requiring some mild tonic or bitter infusion, to restore the lost tone of the stomach. The muriated tincture of iron has also been used for the same purpose; it may be given in doses of from two to ten drops, largely diluted with water, two or three times a day. The leaves of the arbutus *uva ursa*, given in the dose of five to ten grains, to children of five or six years, are a useful means of controlling the action of the kidneys; this medicine possesses both tonic and astringent properties.

Of late, the extract of nux vomica has been highly recommended by the German physicians, in incontinence of urine.* It is said to be more applicable to children for irritability, from whatever cause it may arise, as its action is confined particularly to the spinal marrow, and does not disturb the sensorium, like preparations of opium. This is a remedy which I never have tried in the affections of children, and therefore am unable to give any result from experience. It is too hazardous a remedy for so trifling a complaint. It has been given in Germany, in the proportion of a grain mixed with four ounces of mucilage. A teaspoonful of this mixture, every two or three hours, is the dose for a child from one to three years; while the tincture of the seeds is applied by friction to the loins.

A blister to the loins has been occasionally found serviceable, as well as the more permanent effects from the use of stimulating plasters, such as Burgundy pitch. The latter may be made a little more efficacious, by the addition of some stimulating substance, such as camphor.

With respect to instrumental means for relieving this disease, they ought, as much as possible, to be avoided; but in obstinate cases, which resist all other means, the introduction of a bougie or sound into the bladder will sometimes be found useful, by stimulating the neck of the bladder, and exciting a new action in the part. Instruments, however, which have sometimes been applied to the penis, for the purpose of compressing the urethra, are decidedly injurious in various ways to young children, and ought never to be employed. Although they may arrest the flow of the urine for the time, they never cure it; and the injury done to the part, and the premature excitement they cause to the genital organs, are far greater than the temporary advantages resulting from their use.

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* Schwartz, Heidelberger Medicineische Annalen., Bd. i., H. 1, 1835.

DYSURIA.

Dysuria attacks children at all ages, and is one of the most distressing diseases of infancy, and often, like other affections of the urinary organs, will continue for some time without any suspicion of its existence.

Etiology.—It may arise from different causes; inflammation in the bladder, urethra, or kidneys, or the presence of oxyures *vermiculares* in the rectum, will give rise to difficulty and pain in urinating. The excitement of the system during teething, and the derangements of the digestive organs at this time, attended with an acid state of the imperfectly-digested food, will also excite dysuria. This condition of the digestive organs tends always to the formation of lithic acid, and urinary calculi is the result. Quite young children are often affected with calculous diseases, the concretions existing in the kidneys, ureters, bladder, or urethra; and they have been found lodged beneath the prepuce. It is well known that they consist essentially of lithic acid; and where the mass of calculus is composed of phosphatic salts, the nucleus is lithic acid.

There is a variety of dysuria which is occasionally met with, and which Dr. Willis, in his late work, speaks of having seen a few cases. It is a symptomatic form of disease, and is the same as described by Professor Schoenbein, and the name of urodialysis neonatorum.* The symptoms of this affection are described by him as follows:

A very small quantity of urine is voided, and often only a few drops at a time; it is high-colored, and stains the linen yellow. It is evidently attended with great pain, for the little patients cry violently, and draw up their limbs as if suffering great distress. It is dependant on the condition of the digestive organs, as is evinced by the acid odor of the breath, and the knotty and indurated state of the alvine evacuations: it is uniformly attended, also, with a highly irritable state of the skin.

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* Op. Cit., p. 28.

Semeiology.—Distress on urinating may be suspected by the cries of the child, caused by the pain and tenesmus it experiences when passing urine. This fluid flows only in drops, with great effort. In general it is high colored, and when the difficulty is caused by calculous concretions, is sometimes mixed with blood.

When there is sand or gravel, it may be known by the deposite of lithic acid, on permitting the urine to stand undisturbed for a short time; the immediate causes of this deposition are the chemical changes spontaneously occurring in the urine, but which it is unnecessary here to particularize. The precipitate is a brown sediment, either in the form of powder or small crystals. At times it is of a purple or pink color, from the combination of purpuric with lithic acid.

As is the case in adults, these evidences of a morbid state of the urine are occasionally absent, while the child is suffering from larger accumulations of calculous deposites. The only method of ascertaining the existence of calculi is with the sound, or perhaps they may be discovered by the finger introduced into the rectum. But when a calculus is arrested in the ureter, great suffering may exist without our being able satisfactorily to ascertain the cause. Children affected with calculi are very liable to convulsions, in the state of high sensibility at the tender age of infancy.

When inflammation exists in the urethra, or neck of the bladder, or in the mucous coat of the bladder itself, a quantity of mucus is discharged with the urine; this symptom attends the urodialysis neonatorum above mentioned. In this affection there is much febrile action; the skin is hot and irritable, and often becomes the seat of eruptions of different kinds, either prurigo or urticaria. At other times, the cutaneous disorder appears under the form of psydraceous pustules scattered over different parts of the body, causing troublesome sores, especially in the folds of the skin.

The symptoms of dysuria may be easily detected by a little attention; for the child cries most violently when about to make water, and which is only voided in drops. During these paroxysms he will often carry the hand to the genital organs.

Treatment.—The treatment should, in every instance, be commenced with mucilaginous drinks, emollient applications to the pubes, enemata of infusions of linseed or catnep; the latter is an excellent anodyne in painful affections of children, affecting either the lower intestines or urinary organs. The hip bath, also, forms an essential part of the treatment of all disorders affecting the urinary organs. The excitement of the system during teething, and the disorders of the digestive organs arising at this time, demand the special attention of the physician. As the stomach abounds in acid, the usual measures for destroying its excess must be employed, while close attention is paid to the improvement of the digestion.

Among the alkalies, soda seems to possess the most powerful influence on the bladder in controlling its irritability. As the connexion between the acid state of the stomach and bowels, and the urinary organs, where calculous concretions are formed, is evident in all that are affected with the latter disease, the use of soda becomes a very prominent means in the treatment of those cases of dysuria which are dependant on the formation of lithic acid. It not only corrects the acid in the stomach, but also the secretion of lithic acid in the kidneys. Where there is any hereditary disposition to calculous diseases, they may almost with certainty be prevented by the timely and constant use of alkaline remedies. The annexed formula may be given where there is much indigestion existing, and where a mild tonic is indicated; it may be administered in some barley water, gruel, or other mucilaginous drink, three or four times a day.[*] Under other circumstances it will be necessary only to give the soda uncombined with any other remedial agent, either in the form of lozenges or solution, from three to twenty grains in the course of the day. The perseverance in this plan will effectually prevent the formation of lithic acid deposites in the kidneys and bladder.

During the employment of these means, additional measures may be needed to influence the digestive organs, by exciting the secretory functions of the liver and intestines. Calomel and rhubarb may therefore be given, to which ipecacuanha should be combined, if there is any fever.[†]

It is only in the prevention of the formation of lithic acid, that we chiefly can expect any success by the use of these means. The correction of the deranged digestion, and the neutralization of the excess of acid, will therefore form the principal object in our treatment; the latter especially, when the red crystalline deposite exhibits the predominance of lithic acid in the system. On the principle that diet, destitute of azote, is as applicable to the disease in question, as an opposite course is found in diabetes mellitis, M. Magendie has recommended a vegetable diet generally in this affection, where azote is in too great excess.

A white deposite, indicating the presence of phosphatic salts, requires a different course of remedial agents. In such cases Sir William Prout recommends mineral acids, uva ursi and cinchona.

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[*] ℞ Rad. Colomb., gr. x.
Sodæ Sesquicarb., gr. xl.
Aquæ Ferv., ℥ij. M.
A teaspoonful three or four times a day.

[†] ℞ Pulv. Rhei., gr. vi.
Hydr. Subm., gr. iv.
Pulv. Ipecac., gr. j. M,
Divid. in pulv. No. iv.
One twice a day to a child four years old.

Muriatic acid is particularly recommended by him. A child from two to six years of age may take a tablespoonful of a mixture, composed of a scruple of acid and six ounces of water, three times a day. The muriated tincture of iron is also useful, as it combines the tonic effects of the iron with the specific effects of the acid, which is always in excess. It may be given diluted with water, fifteen drops to two ounces—a teaspoonful, three or four times a day, to a child of the same age. Anodynes, in such cases, are also indispensable, and may be united with tonics. As in other diseases of children, attended with great irritability, Dover's powder is one of the most useful forms in which opium can be administered. Where it is necessary to keep the bowels open, the neutral salts should be substituted for magnesia and other alkaline purgatives; this may be rendered somewhat more efficient by the free use of diluents.

RETENTION AND SUPPRESSION OF URINE.

Retention of urine is an affection which Dr. Dewees remarks is more frequent than is supposed, and that some infants have perished from this cause without its having been suspected. Immediately upon the birth of the child, the effects of the impression of the air upon the surface of the body are apparent, as well as on the mucous membranes exposed to its influence. The nares and bronchial passages both give evidences of the excitements they experience from the stimulating influence of the cold air; and the bladder, from its sympathy with the skin, is one of the first organs to contract and repel its contents. Although one of the first excretions, yet it sometimes happens that the urine does not flow for some days after birth.

Etiology.—The obstruction to the passage of water may arise from spasm at the neck of the bladder, or congenital inflammation of this part, or of the rectum; or from the clogging of the urethra by inspissated mucus. Besides these causes, in the first days of infancy, the irritating qualities of the mother's milk may become a cause of this affection; or, during the process of teething, when the teeth protrude with difficulty, a retention of urine may arise.

Semeiology.—From whatever cause it arises, the child evinces great distress on attempting to urinate, and cries violently at such times, while it appears continually to suffer from some pain. In older children there will not be so much difficulty in ascertaining the nature of the suffering, but in young infants it is often a matter requiring close attention to ascertain the cause of the distress. As it is a disease of great danger, the condition of the diapers should be carefully examined, whenever a young infant suffers great pain and cries much. No reliance should be placed on the representation of nurses that the urine is regularly discharged, unless they positively state that it is found regularly wetted. When the disease is suspected to exist, the abdomen and pubic region should be examined; they will generally be found tender, very painful, and much swelled.

Where retention has existed for some time, fever arises, the skin becomes hot, a determination of blood takes place to the brain, and convulsions and death ensue, even when its cause has not been suspected.

TREATMENT.—Where it arises immediately after birth, its cause is frequently the existence of a little mucous clogging up the urethra, and which may be removed with a small probe. Fomentations with hops, or a flannel dipped in warm water, may be applied to the pubic region; or frictions may be used over the affected part with camphorated oil, which will often relieve the spasm of the neck of the bladder. If these are ineffectual, the whole system must be relaxed by immersing the child in a warm bath; an enema of warm water alone is also a useful adjunct to the other measures.

If these means fail to procure a flow of urine, no time should be lost in resorting to the use of the catheter, the only effectual method of relieving retention of urine. A small-sized flexible catheter should therefore be introduced into the bladder, which, in a young infant, it is scarcely ever necessary again to use.

If the fever continue, and cerebral oppression arise, a couple of leeches applied behind each ear may be necessary to relieve the congestion, and prevent the occurrence of convulsions.

With respect to retention of urine arising in children that are teething and sucking, the evident exciting cause will sufficiently point out the remedies which are applicable to such cases. The mother should use diluent drinks, and avoid all stimulating aliments which impart an irritating quality to her milk.

If, on examining the hypogastric region, the bladder be found empty, which may be suspected when there appears to be no swelling or pain in the part, there is then doubtless a suppression of urine. This disease, anuria, arises from a defective action of the kidneys, and it occasionally happens that this function is not exercised for twenty-four or even forty-eight hours after birth; not having been established. It appears to arise from a congenital paralysis of the kidneys. Retention of urine may also arise from congenital deformity of the male in the urethra. This passage is sometimes entirely absent, and is usually accompanied with other deformities in the anterior portion of the bladder and parietes of the abdomen. Congenital hypospadias, where the urethra passes a short distance along the penis, and opens on its lower surface, may exist. The orifice of the urethra is also sometimes simply closed; an incision may in this case be made, and the part kept from uniting by means of a tent, or a small piece of gum-elastic catheter.

The means to be resorted to in the treatment of suppressed urine, are such as will excite the secretory action of the kidneys by a direct influence on these organs: such as an infusion of parsley-root, apium *pretrosclinum*, with a few drops of sweet spirits of nitre. In ordinary cases this will generally succeed in relieving it, while enemata and the warm bath are at the same time used. The latter is especially beneficial in all the forms under which the disease appears. In this affection mild diluents should take the place of any excitant to the kidneys, whenever fever is present; and in any form of the disease when there is evidence of inflammatory action in the affected part, leeches should be applied to the lumbar region.

DIABETES.

Diabetes is usually divided into two species: diabetes insipidus, and diabetes mellitus. The former, which corresponds with the hydruria of Dr. Willis, in his recent work on the subject of the diseases of the kidneys,* is characterized by the simple, increased quantity of urine, independently of any increased action of these organs, from imbibing largely of some watery fluid. The other species, or melaturia, as it has been recently called, is distinguished by a quantity of saccharine matter in the urine, which is also very greatly increased in quantity. Both these forms affect children; the first-mentioned is that which is most frequent.

There is another variety which may be classed with the insipid form of diabetes; this is where the copious discharge is attended with a deficiency of urea, and described by Dr. Willis, by the name of anazoturia, from the absence of the azotic principle of the urine. This is the form of the disease which he observes has been so often reported as cured, and is the kind most frequently occurring among the children of the poor, who suffer greatly from privation of both food and air.

In treating of this disease, the name so long used to designate an excessive secretion, will be retained; and although it is more philosophically correct to disunite that form in which the urine, although in excess, still retains the proper proportion of its solid ingredients, from that in which it is destitute of one of them, yet the distinction is one which it is sometimes difficult to make; while the term diabetes is applicable to inordinate secretion, and frequent evacuation of urine, attended with great emaciation and debility, whether the urine is deficient in its component parts, or whether it is, on the other hand, characterized by the remarkable additional qualities it acquires in the saccharine form. Besides, it will be more suitable to the nature of the present treatise to treat the subject in a more general sense; as it can scarcely be considered the peculiar object of this work to enter into a discussion of the nature of such diseases as are common to all ages. A concise view of the subject, with reference to its occurrence in children, and any remarkable aspect it may assume, or treatment it may require on this account, is all that can be expected in a work devoted exclusively to the diseases of children. For more particular information, therefore, as to the pathology of diabetes, and the distinctions which modern science has made in the various renal affections, other and more elaborate works may be consulted.

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* Urinary Diseases, and their treatment, by Robert Willis, M. D.; London, 1838.

As occurring in children, diabetes was first noticed by Morton, in 1694,* and described much more recently by Venables,† whose observations are exceedingly valuable with reference to the disease in children. The last-mentioned of these writers has noticed the two kinds; but all agree that the insipid diabetes is the most common in early life.

Etiology.—As to the predisposition to the disease, it is in some instances hereditary, as several members of a family, and their descendants, have been known to be affected with it; and it frequently occurs in those of a scrofulous habit, although not confined to them. It has been remarked that phthisis has not unfrequently both preceded and accompanied diabetes; and that there is scarcely an instance of this disease existing among adults that is not attended with some pulmonic affection. It has been noticed to alternate with it, and the symptoms of phthisis have for a time been suspended; and on the temporary relief of the diabetic symptoms, the tubercles have become fully developed, and have passed through their various stages, and terminated in the death of the patient. It therefore appears in some measure connected with the imperfect assimilation in the ultimate tissues, occurring in the scrofulous habit.

The ordinary exciting causes appear to be exposure to sudden vicissitudes of the weather, and the use of improper and badly prepared food. Experiments on the lower animals prove the influence of a certain species of diet on the urinary secretions. Dogs and rabbits fed on rye-meal, or exclusively on wheat-flour, become greatly emaciated, while diabetes insipidus is produced. It is also known to arise with the changes in the system occurring during the period of dentition, produced probably by the changes which occur at this time in the functions of the digestive system. Teething adds to the general irritation in this as well as in other diseases.

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* Phthisiologia, sive Exercitationes de Phthisi., by Richard Morton, M. D.; Lond. 1694.

† A Practical Treatise on Diabetes, etc., by R. Venables, M. D.; London, 1825.

SEMEIOLOGY.—Children are rarely if ever affected with it after the fifteenth month. It is most liable to occur about the period of weaning, as would be supposed would be the case, when it is considered how intimately it is connected with diet. This remark is applicable, of course, to infants, for the disease occurs at all ages; and pure diabetes mellitus has been noticed from the age of three years to twelve, including also the period of infancy.

For the most part it is very insidious in its approach, and emaciation and languor exist for some time before the cause is suspected. If the increased discharge of urine be at all remarked at first, it is scarcely regarded as a disease, and much time is necessarily lost before proper treatment is instituted. The languor and emaciation, which are prominent symptoms of the disease, steadily increase from the great loss of the solid matter of the body; for experiments show that although the thirst is very great, yet the quantity of urine passed far exceeds the fluids taken by the mouth. As the disease advances, the skin becomes dry and flabby, the little patient is feverish and fretful, and excessively prostrated. At first, the alvine evacuations are not much altered from their natural condition, but with the progress of the other symptoms, they also become greatly deranged, showing a great alteration in the secretions of the liver and intestinal surface; the former exhibit an increase in the bilious discharge, while the latter show a slimy and inspissated state of the mucus, furnished by the muciparous follicles. Among the abdominal symptoms, are the increasing enlargement and tenseness, while the steady emaciation presents a strong contrast, resembling, in this respect, the progress of the mesenteric disease.

The circulation, which at first is but little affected, becomes more excited; the pulse is quickened, and is afterward weak and small, while a considerable degree of fever exists as the disease advances.

As in the adult, these symptoms are attended with an excessive discharge of urine, and the desire for passing it is incessant. Dr. Francis informs me, that in a case which occurred to him in a child aged twenty months, six pints were discharged in the course of twenty-four hours, for several days. Dr. Mott* recorded the case of a boy aged nine years, who voided from nine to ten pints daily, of a clear limpid urine, very sweet to the taste. The light limpid color is characteristic of the urine destitute of its urea, the azoturia of Dr. Willis. The non-existence of urea may be ascertained by evaporating a portion of urine, when it will scarcely leave a residuum. In urine still retaining this essential property, it will evaporate to the consistence of a thick syrup, which, on cooling, concretes into a crystalline mass. This will be sufficient to ascertain the fact, should any doubt exist, without proceeding further with the analysis. The thirst is generally proportioned to the quantity of urine discharged, but the quantity of fluid usually exceeds the quantity taken. It is a very distressing symptom, and one which, in a young child, might easily be disregarded, as thirst is of very common occurrence. Although, for the most part, the urine is clear and limpid, yet its color and consistency are different in different cases; for in some it deposites white sediment, in others it is of a straw color, while in some instances it is green.

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* Amer. Med. and Philosoph. Register, vol. i., p. 347.

One remarkable symptom exists in this disease in children; it is the strong tendency to cerebral effusion, preceded by all the usual symptoms, such as pain in the head, throbbing of the temples, and other evidences of cerebral congestion. When it has long continued, its termination is in effusion in the brain; and the disease, from inattention to the original affection, is regarded as primarily hydrocephalus.

MORBID ANATOMY AND PATHOLOGY.—The most careful anatomical investigations have thrown but little light on the nature of diabetes. Almost every morbid condition has been discovered in those who have died from this affection of the kidneys. The stomach has been found enlarged, and its vessels greatly dilated. The lymphatic system of the abdomen, also, more than usually developed. Tubercles have been found in the lungs, and various other morbid changes, which appear to have arisen from the long continuance of a violent constitutional affection, and were, to appearance, more the consequence than the cause, such as deposites of coagulable lymph, and serous effusions in the cellular tissue. The kidneys are the parts more frequently found in a morbid state than any other of the abdominal viscera. They are, in general, enlarged, and the blood-vessels leading to them turgid; the renal capsules firmer and harder than usual, while the substance of the kidney itself has undergone some organic changes. They have presented the granular or mottled state described by Dr. Bright, as occurring in cases of albuminous urine.

Although these alterations have been found, there are other cases in which no change was discovered in the size or structure of the kidneys, for both were of the same size and form, and differing in no respect from the state of the kidney in health. In all cases, however, the blood-vessels leading to them are large and turgid with blood. No alterations have been found in the nerves going to the kidneys. The ureters, in some instances, are enlarged, as well as the bladder, and in others contracted. In some cases, no departure from the normal condition has been discovered. It appears that all the alterations discovered in the kidneys are referable to a long continuance of morbid action in them. The liver is usually found congested.

The nature of the disease has not been satisfactorily explained by any pathologist, and it still remains one of the most obscure; for anatomical investigation has not, as yet, presented it in a form whereby we can direct our practice. The only approximation to the truth is to be found in the disorder of the digestive organs, and that the disease primarily exists in the deranged functions of the stomach.

The experiments recently made by Dr. Bouchardt,* go very strongly to prove the origin of the disease to be in the impaired digestive function. One of the most prominent symptoms is excessive thirst, and is always in direct proportion to the quantity of farinaceous or saccharine aliment taken; these being diminished, the quantity of sugar decreases. Farinaceous food forms fecula or starch, in the deranged condition of the digestive organs just mentioned. Sugar is formed from fecula precisely as it is in the laboratory of the chemist, and during the transformation requires to be dissolved, when seven times its weight of water is necessary for the solution. Hence the great demand for water in this disease.

The other form of diabetes, in which the urine is insipid, but destitute of urea, appears to arise from a similar derangement of the digestive organs, whereby a full elaboration of the nourishment is not effected. Urea having been found to exist in the blood, must be formed during the process of digestion.

Treatment.—From the few facts which have come to our knowledge, as to the pathology of diabetes, the treatment is founded. The precise changes in the kidneys are unknown, but that a disorder of the digestive functions exists, is a well-established fact. As in both forms it is dependant on the condition of the digestive organs, these must receive our first attention. It has been seen that both diabetes insipidus and the mellitic variety are produced by farinaceous food; the first step in the treatment, therefore, is to withhold such food as experience has proved to be one of the main causes. For the first suggestion of this fact in the treatment of diabetes, the profession is indebted to Dr. Rollo; and his views have been fully confirmed by repeated experiments on the lower animals, and by the investigations of chemical philosophy, as well as by the favorable result of the practice.

The most appropriate kind of animal food for children is milk, which should be liberally used, and alternated with light broths. The latter, however, may be dispensed with when there exists much heat of the surface. Jelly made with isinglass also forms an excellent article of diet. The bowels should be kept open by mild aperients, and rhubarb and aloes, from their tonic effects, are the best that can be employed. The rhubarb may be given in infusion, as the taste may be concealed more easily in this form than in any other.[*] After the operation of this, some anodyne should be administered: opium, however, with great caution, owing to the strong tendency to cerebral congestion in children affected with this disease. Hyoscyamus, from its salutary action in not accelerating the pulse, is better for those cases in which there exists fever, than opium, besides the advantage gained from its not increasing the tendency to fulness of the blood-vessels of the brain. The proper dose of hyoscyamus is a quarter of a grain, for children within the year; older children may take a half to one grain, three or four times a day. The only form in which opium is admissible in this disease, is Dover's powder; a grain of which may be given two or three times a day to a child two years old. During the use of these means the skin should be kept excited by the warm bath, or by the use of a flesh brush; a very important measure in all diseases of the kidneys, and every case of diabetes is accompanied with an affection of the skin.

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* Revue Médicale, Juin, 1839.

Among the remedies which have been used for the relief of diabetes in children, and in the hands of M. Venables with success, is the phosphate of iron; it is both astringent and tonic in its operation, and therefore useful in this disease, where its employment is not counter-indicated by the febrile action of the system. It may be given in doses of from two to three grains to children aged between one and three years, and from five to ten grains to children from four to seven.

On the appearance of any inflammation in the kidneys, leeches should be applied to the loins, and the ordinary measures adopted for the purpose of combating inflammation.

In the simple form of diabetes, known as the disease termed azoturia, bitter infusions, with alkalies, have been found the most beneficial, by Venables, Prout, and Willis. An infusion of gentian or colombo, with the sesquicarbonate of soda, will be found useful, while mild anodynes, as already mentioned, are used. Dr. Dewees advises spirits of turpentine applied to the clothes in such a manner as to create an atmosphere of trebinthinate vapor around the child; in this manner he has cured several cases. From the successful results which have followed the internal use of iodine, made after the formulæ of Lugol, and also the administration of the hydriodate of potash, in three obstinate cases of the mellitic variety which occurred in adults in the practice of Dr. Francis, the

[*] ℞ Infus. Rhei., ℥jss.
Tinct. Cinnamon., ʒss.
Syrup. Simpl., ℥ss.
Tinct. Aloes Comp., ʒj. M.
One or two teaspoonfuls every three hours.

employment of this new remedy promises advantages which will probably lead to its more general use in this disorder.

During the period of teething it will be necessary to examine the gums, and cut them, if the teeth appear to be pressing upon them, and thus take off one source of irritation on the system.

CUTANEOUS DISEASES.

The great multiplicity of cutaneous diseases, their different causes, and the almost endless variety of their appearances, render a proper classification of them necessary, that they may be advantageously studied and properly treated; for without some distinctions, founded either on their pathology or cause, or on both combined, it is in vain to expect to possess any correct principles for their management.

The first attempt at classification appears to have been made in 1585, by Mercurialis,* who separated those diseases which affect the scalp from such as exist on other parts of the body. Turner† adopted a similar division, from remarking an essential difference in the treatment necessary in those affections occurring in parts covered with hair, and in other parts of the tegumentary surface; he also refered to the causes as a good basis for their classification. Lorry,‡ in 1777, in his work on the same subject, maintains the same views, with some modification. Plenck afterward arranged cutaneous affections according to their appearances, without taking into consideration their etiology, or rather rejecting it altogether.‖ Willan and Bateman's classification is based on the same views,§ which are also adopted by Alibert and Rayer, who have greatly multiplied the number of affections incident to the skin.¶

Plumbe, in his able work on this subject, has considered more the cause of these affections, and in his classification has referred to the influence of the constitutional condition in giving origin to them, or modifying their character and progress; unquestionably the only safe course to proceed with reference to these diseases, which are more frequently symptoms of the existence of other morbid affections; and he justly remarks, that there can be no correct arrangement for practical purposes, in which the constitutional causes do not form some portion.* The same view has been adopted by Dendy, and applied by him to a much larger number of these diseases than is embraced in Plumbe's treatise.†

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* De Morbis Cutaneis. Venet., 1572.

† A Treatise on the Diseases Incident to the Skin, by Daniel Turner, M. D.; London, 1714.

‡ Tractatus de Morbis Cutaneis; Paris, 1777.

‖ Doctrina de Morbis Cutaneis, J. J. Plenck; Vien. 1783.

§ Description and Treatment of Cutaneous Diseases, by R. Willan, M. D.; Lond. 1805. A Practical Synopsis of Cutaneous Diseases, by Thomas Bateman, M. D.; Lond. 1814.

¶ Description des Maladies de la Peau, par J. L. Alibert; Paris, 1814. Traité Theorique et Pratique de la Malad. de la Peau, par M. Rayer; Paris, 1826.

All the existing arrangements of these diseases are still evidently imperfect; and one based on scientific principles, which may be made practically applicable, is still a desideratum. The difficulty, however, of this part of the subject is acknowledged by all to be very great. A want of accuracy and precision exists in all the systems, founded either on the pathological conditions of the part, or on the external appearances of these affections. If, on the one hand, the pathological alterations of the parts be taken as the basis of the classification, the difficulty at once meets us in the fact, that it rarely happens that one tissue alone is affected through the course of the disease; others become involved, offering a complication of the original affection, in the pathological alterations of other portions of the cutaneous system. Again, if the phenomena they present be taken as the groundwork, a similar difficulty will be found to exist, for the reasons just mentioned. Although great skill and singular accuracy have been exhibited in the pictorial delineations, yet as the appearances change, not only from the natural course of the disease in one tissue, but likewise from its involving other portions of the cutaneous system, whereby a disease, with the well-marked appearance of one genus, may present that of another in the course of its progress, it is evidently not safe to rely on an arrangement so arbitrary and artificial.

Difficulty also attends the more recently revised system of arranging them according to their etiology; the same disease being at times produced by different causes. A system founded, both on the anatomy of the skin, with the seat of the morbid changes occurring in it, and the influence of external and internal causes in the production of these morbid changes, appears to be the correct and only one for practical purposes which could be adopted. The subject is one almost, if not altogether, impracticable in the present state of science. An increased attention, however, to the anatomy of the skin, has been manifested within a few years; a subject which affords a better opportunity for the successful culture of the knowledge of morbid conditions now under consideration, than can be derived from the simple inspection of the diseased part, unconnected with its state in health. The recent works of Breschet, Vauzéme, and Gurlt, on the anatomy of the skin, may be regarded as highly important in directing the investigation of the diseases of the skin, to the state of the various parts of this complicated structure—the seat of several important functions—in its normal condition.

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* A practical Treatise on the Diseases of the Skin, etc., by Samuel Plumbe; London, 1824.

† Practical Remarks on the Diseases of the Skin, etc., by Walter C. Dendy, Surgeon, etc.; Lond., 1837.

Without pretending to be able to simplify a subject which has baffled the genius of many distinguished men, I shall confine myself principally to the consideration of the causes of cutaneous affections of children, inasmuch as it appears to be more usefully applicable in their treatment, than an arrangement founded on their external appearance. It is to their causes, therefore, that the arrangement here proposed will be chiefly directed.

The pathology of these affections will also be considered in a general manner, in connexion with the etiology, as a guide for the arrangement; which will be such a modification of the existing systems, as experience justifies in considering the best applicable to their management.

General Etiology.—The first of the predisposing causes is the hereditary conformation of the skin. Besides the actual alterations in its condition, exhibited in the existence of nœvi materni, congenital spots, and malformations, these parts, as well as others, participate in the molecular changes arising from the transmission of peculiarities in the process of nutrition. Hence we find the obstinate diseases which occur in those who inherit a scrofulous diathesis, and also the eruptions on the surface, arising from the transmission of syphilitic affections.

But independently of this, there are those who are born with an extremely irritable state of the skin, although no such morbid condition could be found to exist in their parents. The latter are remarkable for their robust health, and transmit to their posterity that abundance of vitality, which greatly disposes those parts that are exposed to the immediate action of exciting causes, to pass into a morbid condition. Very severe inflammations have occurred under such circumstances, showing the predisposition to disease abounding in a part in a high state of vitality and development.

The abundance of blood in the tegumentary tissues of an infant, imparts a strong predisposition to inflammatory affections, easily excited; hence the early appearance of an eruption, on the application of a very slight degree of their ordinary exciting causes. M. Valleix describes a species of pustule, occurring in newborn children, which appears to depend on the ordinary state of vascular excitement or congestion natural to children at this age. These pustules are usually mistaken for a congenital syphilitic affection, from their early occurrence; this opinion he conceives to be erroneous, from the frequent mildness of the disease, and other circumstances connected with its rapid disappearance without the interference of art.

From the same cause many children are affected from birth with an inflammation of the sebaceous follicles, producing a disease of the most remarkable obstinacy.

Although diseases of the skin generally may occur in any class of persons, and under a variety of circumstances of constitutional and local derangement, yet they are most likely to take place where there is an enfeebled state of the capillaries of the skin, exhibited in the irregular and imperfect action of the functions of this part, especially in children advanced beyond the period of infancy, where the normal action assumes more the characters which are peculiar to the state of the adult. Whenever there exists a want of uniformity in the proper action of the part, as appears from the irregular action of the sudatory glands, the cutaneous secretion being easily excited or suppressed, there is a much greater liability to cutaneous disease. An excited state of the blood-vessels, in this condition of the capillaries, is much more liable to terminate in disease, than when the entire assemblage of the functions of the skin is in a normal state.

In some degree allied to this last-mentioned condition of the capillaries, is the congenital or acquired debility of the cutaneous vessels. Such a state produces those affections characterized by a deficiency of vigor in the capillary vessels of the skin, causing alopecca, elephantiasis, ptyriasis, ichthyosis, etc.

The exciting causes of all cutaneous diseases may be referred to such as act directly on the skin; to the sympathy which the skin experiences with the derangements, either functional or organic, with other organs, and to the peculiar effects of a specific contagion on the dermoid surface, which this part experiences in common with other tissues.

Among the external irritants of most frequent occurrence is caloric. The atmosphere acts directly on the external surface of the body, and when a high atmospheric temperature exists, an active and an extremely irritative action characterizes the diseases of the skin. The increased action of the vessels on the surface, from an increase of atmospheric heat, is familiar to every one, and scarcely needs an illustration. Eruptions are much more severe in hot climates than in temperate regions, and, as would be supposed would be the case, are in general more frequent. In tropical climates the lichen *tropicus*, or prickly heat, is much more severe than in the tropical summers of some temperate climate. The eruptions common to young infants, from the highly vascular condition of the skin, are greatly increased, if not altogether produced, by the direct application of heat to the surface. Strophulus is much more extensive in summer than in winter, or where, from the over tenderness of parents and nurses, the skin is maintained in a state of excessive heat from artificial warmth of the apartment, or from a too great quantity of clothing, especially if it be of an irritative nature. Roseola, also, is a cutaneous affection, depending on the direct action of heat for its production. It occurs more frequently in summer and autumn than at any other season of the year; and although occasionally complicated, as indeed are all other diseases, with a disturbance of the digestive organs, yet it depends for its existence on the immediate action of heat.

Most cutaneous diseases are very seriously aggravated on the approach of summer, although there are some, such as lepra and inpetigo, which exhibit an opposite effect, being relieved in summer, and becoming more aggravated in winter.

Exposure to the rays of the sun, to the heat of a strong fire, and, on the same principle, to extreme cold, will cause cutaneous inflammation; for a direct injury is thus produced on the skin, terminating in various kinds of inflammatory affections. The same effects follow the application of a blister, the bites and stings of insects, punctures, and any corrosive or irritating substances.

Uncleanly habits are the great sources of cutaneous diseases, as is evident from the effects of ablution in most of these diseases among the poor. Where this is neglected, and a derangement in the secretory functions of the skin is allowed to take place. irritation and itching are the consequences; and the scratching used for its relief aggravates the existing irritation, until ulcers, and a complication of cutaneous affections, which often defy all attempts at classification, are the result. In connexion with this part of the etiology of cutaneous disease, is the burrowing of the small insect acarus *scabiei*, giving rise to the well-known cutaneous affection, which derives its name from the incessant itching—the itch.

Another class of causes is to be found in the disordered action of the internal mucous surface, and principally of that of the alimentary canal. This is a frequent cause of cutaneous disease, and numerous facts go to show the physiological and pathological connexion between these parts. The healthy action of the one is very clearly connected with that of the other, and more especially with the mucous lining of the gastro-intestinal surface. This part is so evidently connected with the pathological condition of the skin, as rarely to be affected without some change being produced in the action of the cutaneous system. Scarcely can any derangement arise in the circulation and secretion of the mucous membrane of this part, without the cutaneous surface participating in some degree in the change, and suffering likewise in its circulation and secretion.

Cutaneous affections may arise from a simple derangement of the functions of the part. A temporary indigestion will cause urticaria, a variety of purpura combined with the peculiar irritative action of urticaria, and other affections of a similar character.

Many acute cutaneous diseases have their origin in inflammation of the same membrane; and those arising from the attack of an eruptive fever have been referred to this as a cause. But this is not the cause of the cutaneous eruption; it is a part of the disease which simultaneously affects both the skin and mucous membrane; and in some of these affections the cellular tissue and meninges of the brain, or peritoneal coat, also participate in the disease.

Another class of diseases, differing from all others principally in the periodical changes they undergo, in their incipiency, maturation, and decline, arise from a specific contagion. Besides this, they are also characterized by the presence of febrile action, from which circumstance they have been denominated eruptive fevers. The presence of inflammation in the skin, although characteristic of these affections, does not always necessarily exist; in some severe forms it has been absent altogether, and the disease has spent its force, generally having a fatal termination, on the brain or other internal organ. The disease of the skin is therefore but one of the strongly-marked symptoms of this class of diseases, but so generally uniform in its appearance, that its absence is regarded as an irregular course; its presence is, in every instance, essential to their proper development.

Among the contagious cutanei are the syphilida, differing from the others in the absence of the changes occurring in the eruption at regular periods, and the formation of the disease, without the necessary fever existing in the former.

General Pathology.—The congenital marks or spots, known by the name of nœvi materni, whatever be their form or color, are in some respects allied to malformations. Some, indeed, may be regarded as such, while others possess an active circulation, making them closely allied to inflammation, Some of these spots appear to be simply a change in the natural pigment; others, are the excessive development of the papillæ and vascular net-work of the skin, with more or less vascular action. Although seated generally in the parts just mentioned, other textures of the tegumentary system may become likewise affected with this congenital hypertrophy.

The most common affections of the skin are inflammatory in their nature, varying in their appearance according to their seat in the different textures, and according to the violence of the affection; these different forms may also arise from some peculiar action of the exciting cause, producing in the same texture a circumscribed, instead of a diffuse inflammation.

Inflammation of the simplest kind is found in the external or cuticular surface of the skin. When this part is affected with a diffuse inflammation, it constitutes erythema, erysipelas, etc. In these affections there is but little swelling; when these superficial inflammations are diffused, and are accompanied with elevated patches, they are denominated wheals, and constitute the disease termed nettle rash. The general termination of these rashes is by resolution, but not without the secretory function of the cutis being materially impaired; a separation of the cuticle is the consequence of this derangement of the secretory action. Dr. Cragie explains this process by referring to the apparent fact, that the cuticle is secreted in successive layers, first fluid, then becoming hard. From the derangement of the secretory functions of the part, this process is imperfectly performed, and the connexion between the secreting surface and the recently secreted portion becomes dissolved; therefore, during the progress of the disease no new cuticle is formed. The morbid action gradually subsides, and as the cutis recovers its healthy tone, a new and delicate cuticle is formed.*

Sometimes, however, a long-continued inflammatory action of this outer surface of the cutis results in the effusion of a watery fluid beneath the cuticle, forming blisters or blebs; this is the most severe form of inflammation of this part.

The cause of this species of inflammation also modifies its appearance. The inflammation of the skin in measles and scarlet fever is always peculiar, both in color and form, although the cutaneous part of the disease does not extend any deeper than the outer surface of the chorion.

Papillary diseases, as strophulus, lichen, and prurigo, are seated in the small eminences of the cutis, called papillæ. These affections are slight, and usually terminate in resolution.

The inflammation affecting the substance of the skin, when occurring in a circumscribed form, gives rise to pustules. This kind of inflammation may either arise on the outer surface of the skin, and successively proceeding inward, and affecting the other portions, or may commence originally in the substance of the skin itself. This circumscribed form produces pustulous inflammations. From the progress of the vesicle inward, it is evident that a distinction between the vesicle and pustule is very difficult to make, as the disease, at first affecting the outer surface of the skin alone, and exhibiting only the characters belonging to a vesicular eruption, may, from subsequently involving other portions, become a real pustular disease. Such is the psydracium; a small, circumscribed elevation of the cuticle first appears: the parts beneath are then involved, and several of them uniting, discharge a small quantity of puriform matter; the affection is so superficial as never to leave a scar or depression. This disease is the closest allied to the vesicular of all the pustular forms. The next disease, and more approximating to the real pustule, is the achor; this, like the former, although discharging purulent matter, leaves no scar. The favus exhibits a deeper affection of the cutis, the pustules being surrounded with a marginal ring, indicating a higher grade of inflammation and a more extended disease. On the disappearance of this pustule a scab forms, which, on becoming detached, leaves a slight scar. The phlyctidium is the pustule produced by the small pox, or by the application of tartar emetic ointment. It is characterized by a circular inflammation of the skin, surrounded by an inflamed circle, which is the outer part of the skin much injected and elevated. Suppuration occurs within the inflamed border, and never extends beyond it. The most perfect form of a pustule is the phlyzacium. It commences in the substance of the integuments, and is a large pustule on a hard circular base, of a red color, slow in its progress, and its suppuration always attended with a considerable loss of substance, and a deep scar. These pustules form the disease known by the general name of ecthyma; one form of which, from its occurring in infants, has been made a distinct species. Inflammation attacking the sebaceous follicles, the corial follicles or sudatory pores, the sacs at the root of the hairs, all produce pustulous diseases, having the phlyzacium for their character.

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* Elements of the Practice of Physic, etc., by David Cragie, M. D., F. R. S., etc.; Edinburgh, 1836.

It is very rare that the internal surface of the skin becomes originally the seat of the disease, without involving likewise the adjacent cellular tissue. When this occurs, the highly inflamed tumor, known as the furunculus, or boil, is the result. The hordeolum, or sty, is also one of the forms of this inflammation. It appears to be an inflammation of the conical prolongations of the subcutaneous cellular tissue, which penetrates the chorion in every part; therefore the affection can rarely occur without extending to the parts beyond the skin. Its progress is always to the surface, with severe inflammation, imperfect suppuration, and sloughing in the internal parts. This slough, or cone, is formed of the cellular membrane, infiltrated with pus.

Although these are the more marked and prominent characters of cutaneous inflammation, yet when more than one part is simultaneously affected, it is evident that it may be difficult accurately to distinguish them for classification. This difficulty more commonly occurs in chronic inflammations of the skin, where the entire mass of the various parts of the chorion may become more or less involved in the morbid action. The consideration, therefore, of their causes—whether of local or general origin; whether from constitutional derangement, from disordered functional or organic action of the gastro-intestinal mucous membrane, or from the action of a peculiar infection on the system—becomes practically of more importance than the simple appearance of the disease. The classification of cutaneous affections, as papular, pustular, vesicular, etc., however correct it may be, can yet go but little to direct us in their treatment. As they are for the most part symptoms of some other disordered action, the disease itself, of which they are but the symptoms, should, if possible, in the first place be ascertained; while the actual character of the cutaneous affection shows the violence of the constitutional derangement, or marks the degree of predisposition in the affected part, to become inflamed on the development of the exciting cause. When no such constitutional disorder exists, and it is ascertained that the disease is purely local, the treatment is necessarily simplified to local applications alone.

The following arrangement is proposed, with reference to those diseases of the skin which are found to affect children; all others are omitted. It is a modification of that proposed by Dendy, and is merely intended to simplify the matter, and to place it in the condensed form necessary in a treatise devoted to general subjects. For more extended information, the various treatises on cutaneous diseases must be consulted.

MORBID CONDITIONS OF THE SKIN, INDEPENDENT OF CONSTITUTIONAL CAUSES.

	I.
From Local Peculiarities, or Conformations of the Skin.	Nœvi materni, Verrucæ, Crinones, Alopecia.
	II.
From External Irritation.	Encausis, Pernio, Vesication, Intertrigo.

MORBID CONDITION OF THE SKIN FROM CONSTITUTIONAL CAUSES.

	I.
From Gastric or Intestinal Disturbance during Lactation or Dentition.	Strophulus, Prurigo, Impetigo, Crusta lactea, Erysipelas, Jaundice.
	II.
From Gastro-Enteric Irritation at all periods.	Urticaria, Lichen, Roseola, Herpes, Purpura, Furunculus, Eczema, Psoriasis, Porrigo favosa, Tinea.
	III.
From Constitutional Debility.	Ecthyma, Rupia, Pemphigus.

IV.

From Specific Contagion.	Scarlatina, Rubeola, Variola, Varicella, Vaccinia, Syphilida, Scabies.

FROM LOCAL PECULIARITIES, OR CONFORMATIONS OF THE SKIN.

NŒVI MATERNI.

There are two varieties of nœvi; flat blotches or apparent stains, and elevated tumors, characterized by a preternatural development of some part of the vascular net-work on the sub-cutaneous cellular tissue.

The first kind are the stains known as port wine marks, or stains resembling those produced by a raspberry. They have also been seen of a yellow, brown, blue, and black color. They are the effect of a diseased action in the corpus mucosum, where the capillary vessels deposite the pigment, or they may exist in the vessels themselves; and a distinction, not however of much practical utility, has been made between pigmentary and vascular nœvi.

This alteration in the normal action of the skin, from the intimate relation subsisting between all the parts, extends sometimes to every portion of the tegumentary layers and their respective functions; it has therefore happened that these spots have, from the altered action of the papillæ of the skin, been the seat of hairs of different colors. These colored spots always become paler on pressure, and are increased in intenseness under the influence of atmospheric heat, or anything that will increase the vascular circulation.

The congenital elevated tumors are of two kinds: erectile tumors, and varicose tumors. The former are of various colors and shapes, and from this circumstance have been compared to cherries, raspberries, strawberries, etc. Sometimes they have a broad, and at other times a pediculated base. They are found usually on the lips, eyelids, cheeks, inside of the thighs, arms, etc. At first they are often very small in size, but their increase is uniform but slow.

Congenital tumors are sometimes more deeply-seated, and of a less regular shape; and, from the mass of sanguineous vessels of which they are evidently formed, are more properly varicose tumors than tumors from a preternatural development of the capillaries, or the abnormal process of nourishment. These have been known also by the names of varicose wens, sanguineous fungi, etc. These affections are in general not to be regarded as serious, unless they are of a large size, or grow rapidly; when such is the case, they may form ulcerations, ending in a fatal hemorrhage.

TREATMENT.—The various methods of treating nœvi are compression, refrigerant applications, styptics, cauterization, artificial inflammation, ligatures to the tumor, or to the blood-vessels supplying it, or excision with the knife.

Compression is only applicable to small tumors situated over hard parts. Mr. Abernethy advises, in addition to compression, the simultaneous use of cold and styptic applications. Where styptic remedies are used, a strong solution of alum is probably about the best; although these remedies will be found of little avail.

The method of exciting inflammation in them by introducing the vaccine virus, has been advised. The application of tartar emetic ointment for the same object has also been successfully used by Dr. Young.*

Cauterizing has been long in use for treating nœvi. It is only necessary in small tumors to touch the superficial parts in succession, and they will in general shrivel up and disappear. For this purpose, quicklime, nitrate of silver, and caustic potash, have been used; the last-mentioned article more easily assimilates with animal substances, and is therefore to be preferred to the others. Nitrate of silver usually leaves an indelible scar, and is on this account an unsuitable application. Caustic applications have been freely used by Mr. Wardrop,† in large and bloody nœvi, without any hemorrhages following; and their use has been uniformly successful. Having excised small tumors with a knife, I can unhesitatingly give the preference to caustic applications. On the same principle, nitric acid is also useful, and I have completely destroyed small nœvi by its use.

Where these tumors are pediculated, the ligature has been used; it was first recommended by M. A. Petit.‡ Messrs. Bell and White have recommended, where the base of the tumor is large, to pass a needle through it armed with a double ligature, and, by tying it on both sides of the tumor, thus enclose it on all parts. Ligatures have also been applied to the principal artery going to the tumor; these are used when the nœvus is of so great a size as to forbid its removal by any other means, or when it involves important or inaccessible parts. It is also used as a preparatory step when the tumor is to be excised, for the purpose of preventing excessive hemorrhage.

Among other methods of treating nœvi, it has been proposed to pass a seton through them;‖ this, of course, is applicable to erectile, and not vascular tumors. Dr. Hall has recommended the introduction of the cataract needle into the tumors, and, without withdrawing the instrument, to pass it in several directions in the body of the tumor.*

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* Glasgow Med. Journ., vol. i., p. 93.
† London Lancet, 1827.
‡ Obs. Chirurg., Paris, 1700.
‖ Lawrence, in the London Lancet, 1831.

It is very important for the welfare of the child that the removal of these tumors be not attempted while the child is quite young. When, however, they are evidently on the increase, the operation should not be delayed, for their great size may render this not only difficult, but dangerous.

VERRUCÆ.—WARTS.

Warts are small elevations, of a hard and rough character, produced by hypertrophy of the papillæ, or of the different layers of the skin. They are insensible on their surface, but at times have some inflammation and increased nervous sensibility surrounding them. Although occurring at all ages, yet childhood is the time of life at which they are most common. After a few years they disappear spontaneously, without returning. In youth, however, they not unfrequently are reproduced after having disappeared. They appear singly and in clusters on different parts of the body, but more especially on the hands.

TREATMENT.—They may be removed by excising them in thin successive layers; and when the blood begins to flow, the surface should be cauterized with nitrate of silver. They may also be removed by tying a fine silk or horse-hair around them, if the narrowness of the base will admit of a ligature.

Any escharotic substance will remove them. The acrid juices of several vegetables are used for this purpose, such as the chilidonium *majus*, juniperus *sabina*, ficus *indica*, etc. Among the mineral escharotics are the muriate of ammonia, which may be rubbed on the warts; first dissolving a portion of it by moistening it, and the nitric acid carefully applied only to the excrescence. The last application is decidedly preferable to any other means that has been recommended; they will almost certainly be removed after a few applications.

CRINONES.

These are the minute black spots which, on being pressed out, assume the appearance of worms. They appear on the face of youth, and on the back and limbs of infants, and are the inspissated sebaceous fluid in the cutaneous follicles. From the resemblance they have to worms, they have been regarded as living parasitical animals. Such is the opinion of Ambrose Paré and Dr.

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* Marshall Hall, Lond. Medical Gazette, 18.

Good; and the latter describes them under the name of malis gardii. Others have regarded them as the morbid production of hairs, whence it has received the name of morbus pilaris.

Dr. Good quotes M. Bassignet, as describing the existence of a peculiar affection of this nature, among newborn children in the town of Seyne, in 1776.* It appeared in the form of bristle, producing a violent itching, distress, and inability to sleep or suck. The treatment pursued was friction over the body with the hand, which produced dark, rough filaments, resembling a hair. For this and other similar affections he advises a solution of coculus indicus, and the powder of the cividilla, a species of veratrum, sprinkled over the bed-clothes. The extreme pungency of this article requires great caution to be used in applying it as a remedy to young children.

These affections appear to have been confounded with the simple collection of inspissated sebaceous matter in the cutaneous follicles, which will at times become a source of great irritation and inflammation. The malis â crinonibus, morbus pilaris, and malis gordii, have all been regarded as one and the same disease.

ALOPECIA.

Baldness is common to all ages; in children it occurs in spots and serpentine lines. The congenital absence, and the ulterior absence of the hair, is of very rare occurrence. Instances, however, of this have occurred, and a case is given by Rayer.†

The variety of baldness occurring in children has been described under the name of porrigo declavans. It occurs in patches, sometimes circular and at other times in a waving and serpentine form, which are entirely divested of hair, without the surrounding part having less than the normal quantity. These patches and lines extend, and several of them uniting, baldness to a very great extent ensues. It is difficult, if not impossible, to assign any cause for this defect, no eruption nor inflammation either preceding or attending the affection.

TREATMENT.—The applications most in common use are those of a stimulating nature. Decoctions of walnut leaves, of the solanum niger, centaurea minor, stimulating ointments, made of the essential oils, have all been used. Mercurial ointment has also been used with advantage. It is often a very obstinate disease, and will frequently resist the application of remedies for months, and even for years.

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* Hist. de la Soc. Royale, 1776.

† Op. Cit., p. 1050.

FROM EXTERNAL IRRITATION.

ENCAUSIS.—BURN.

As accidents from burns and scalds are very common among children, it will be useful to devote a short space to the consideration of the morbid changes thus produced, and their most approved treatment.

A great diversity of opinion has for a long time prevailed on the subject of their treatment, and remedies of the most opposite nature have been recommended for their most speedy cure; and, although a wide difference of opinion still exists on this subject, yet more rational views now exist, since a greater accuracy has been made in the division of injuries from these causes, and their classification, according to the extent of the injury.

Burns and scalds are serious in proportion to their extent and depth: the danger being greater where these two circumstances are united. The most common occurrence whereby children are burned, is by their clothes catching fire. Scalding, also, is another frequent accident, but not so extensive nor so serious as the former. For the proper management of these accidents, according to their pathological condition, it has been usual to divide them according to their depth, or the number of tissues affected. That of M. Dupuytren is the most comprehensive, embracing, as it does, every form in which the effect of caloric occurs, from the simple erythematic inflammation, to the entire combustion of the part or member.

There are, according to him, six degrees of burns. The first is that of a simple redness; the second, vesication; the third producing a sloughing of the rete mucosum; the fourth, sloughing of the derma; the fifth, sloughing of the muscles; and the sixth, the complete destruction of the limb.

Erythema is the slightest effect produced by caloric, and it may occur from any cause by which heat is applied to the surface of the body. When water, at 150° Fahrenheit, is applied to the skin, rubefaction is all the effect produced.

Where the cause is more powerful, blistering is produced, accompanied with much more pain, especially when the nerves of the cutaneous surface are exposed to the action of the air, from the rupture of the raised cuticle. This degree is at times attended with irritation of the gastro-intestinal mucous membrane.

From the application of a still more energetic cause, the third degree, or sloughing of the rete mucosum, is produced. This, besides the prolongation of the cure, from the necessity of suppuration, and the complication of gastro-enteritis, when the burn is of any extent, makes this state one of great danger. The well-known sympathy of the internal mucous membranes with the cutaneous surface, is the cause of this complication, which, however, does not uniformly take place in burns of the first and second degrees, from the rapidity of the cure not allowing time for the development of gastro-enteritis. The first two usually heal without leaving a scar; this never does, as it is never cured by resolution.

In burns of the fourth degree, the sloughs must separate before the part can heal and cicatrize, while a high degree of inflammation invariably attends the injury, and from this cause, and its long continuance, greatly endangers life; the danger being proportionate to the extent and depth. In burns of the third degree, the inflammation appears in a few hours, at most, after the accident, reaction following shortly after a comparatively slow action of heat. The rapid disorganization occurring from the sudden application of a high degree of heat, prevents reaction for some days in those burns classed in the fourth degree. The burnt part is dry and shrivelled, and completely deprived of vitality. The application of the actual cautery, or the moxa, produces burns of the fourth degree.

Those of the fifth and sixth are uniformly fatal; the extensive slough and suppuration causing death in such as escape the first shock.

TREATMENT.—The indications, in burns of the first and second degrees, are to relieve the pain and arrest the inflammation; in those of the third and fourth, to prevent constitutional symptoms and excessive suppuration, and to promote a speedy separation of the sloughs. In the other two, but little else can be done besides removing the limb, if the injury has occurred so as to admit of amputation.

The means of fulfilling the indications mentioned first, have been exceedingly variable, and entirely opposite in their nature. These measures have been, refrigerants, heat, stimulants, astringents, and oily substances. Each have had powerful advocates, and the success which, it is alleged, has followed their use, is attributable to the different stages of the burn, and the influence of the constitutional vigor in controlling their effects.

In the simplest form of the burn, producing an erysipelatous inflammation, the refrigerant plan is unquestionably the best; and it is difficult to conceive how the opposite course can be in any way beneficial, unless the patient, from the shock, suffers from a feeling of coldness. Instinct prompts us to use at once such measures as will relieve the violent pain in the part, which is speedily affected by cold or iced water; and slight burns or scalds are in a short time cured by these means.

Cloths, wetted with cold water, or bladders partially filled with

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pounded ice, should be applied to the parts; the latter, however, with great caution, especially if the burn be extensive. Although ice has been used with great advantage, yet it is by far the safest practice to use compresses dipped in cold water. Where cold is quickly used, vesication may often be prevented; for a burn of the second degree will occur, from a continuance of the high action constituting the first degree; and that which at first was an inflammation simply of the affected part, may pass into that where there is a separation of the cuticle, and the effusion of serum beneath it. Evaporating washes, which act on the same principle, are useful; and a small quantity of brandy or alcohol may be added to the water, and the part covered with a thin cloth, to promote evaporation.

Heat has been a popular mode of treating burns, and applied by exposing the part to the action of the fire. This method is only applicable to burns of very limited extent; and from the severe pain attending it, can not be applicable under any other circumstances. The modus operandi is, by continuing the violent action of the part already affected; the vitality is at length destroyed; the pain ceases; the part becomes hard, resembling horn, and separates from the living part. It is evident that this can not be applied, with any prospect of relief, to any other than burns of the first degree.

In almost every kind of burn, except such as have been designated as the fourth, fifth, and sixth degrees, astringents have been used with success; and solutions of alum, or of the acetate of lead, and Goulard's cerate, have been employed, and cold infusions of the astringent vegetables. Sometimes, when the pain is great and the inflammation severe, the application of some narcotic will be highly useful; such as an infusion of belladonna, or of poppy heads. A poultice, made with boiled potatoes, milk, and water, is a very soothing application in recent burns; and raw potato, scraped, is also in common use, and where there is no vesication, is a very useful remedy, possessing in this state some slight narcotic power. Popular practice throughout the country has acceded to the value of the ointment of the extract of stramonium in allaying the extreme irritability of burns, and rapidly removing inflammatory action.

It has been usual to treat burns of the second and third degrees on the stimulating plan, with warm spirits of turpentine or alcohol, applied at first, or the less stimulating application of basilicon ointment. This is the course recommended by Dr. Physic, and generally pursued in this country; but the internal stimulating plan, as recommended by some, can hardly be defended on sound physiological principles, unless, under peculiar circumstances, when, from the extreme shock, the nervous energy is impaired, and the circulation much lessened in its force, producing shivering and a general coldness of the surface. When great pain or prostration attends accidents of this kind, an opiate is indispensable.

The skin of the raised cuticle should be preserved as much as possible; it ought simply to be punctured to let out the serum, without detaching any portion. Warm and stimulating applications should then be used as above mentioned, gradually lessening the strength, until the peculiar irritation resulting from the burn has disappeared. After this, the inflammation must be treated on ordinary principles, with leeches to the surrounding parts, poultices, etc., according to the indications in each case. When the cuticle is granulating, the annexed prescription is recommended by Sir A. Cooper, as exceedingly efficacious in promoting the formation of the new cuticle;* it should be applied by means of lint wetted with it, with oiled silk over the dressing, to prevent evaporation. Perhaps as good a principle for treating burns which have produced an elevation and loss of the cuticle, is to supply the deficiency, and thus exclude the air from the part. This is to be effected by the application of the ordinary liniment of lime-water and linseed oil, with which a layer of carded cotton may be saturated; or with cotton smeared with some mild and unirritating fatty substance.

The chloride of lime has of late been used as an application to burns of the second and third degrees; the pain it is said is immediately diminished, the suppuration lessened, and the sloughs speedily separate, leaving a healthy condition of parts beneath. The subjoined is the formula recommended in the Bulletin Général de Thérapeutique, July, 1838.† Lisfranc, also, in the Gazette Médicale, for March, 1835, bears his testimony to the valuable properties of chloride of lime in burns. He applies over the injured parts compresses, spread with ordinary cerate, with holes in them, that the burnt parts may be exposed; the whole is then covered with lint, saturated with a solution of chloride of lime. This, as well as the chloride of soda, may also be used with great benefit in the first degree, as well as in the second and third.

Creosote has also recently been used with success in burns of the second and third degrees, applied by means of rags wetted with a mixture consisting of twelve drops of creosote in two ounces of water. The burns quickly become desiccated, and heal with a scab or crust.‡

* ℞ Zinci. Sulph., gr. ij.
Liq. Plumbi. Acetat. Dilut., ℥j. M.

† ℞ Calcis Chlorid., ℥ss.
Aquæ Font. ℔j.
Mucilag. Gum Arab., ℥ij.
The chloride to be mixed gradually by rubbing with the water, and when clear, mix the mucilage.

‡ New Remedies, etc., by Robley Dunglison, M. D.; Philad., 1839, p. 166.

With regard to the subsequent treatment of these accidents, and those of the fourth, fifth, and sixth degrees, it must be directed on general principles; and works more particularly devoted to surgery must be consulted for further details.

PERNIO.—CHILBLAIN.

This affection is known by redness, itching, and heat on the feet, nose, ears, &c., from cold, or from the sudden exposure to a warm fire, after being subjected to the influence of a very low temperature. When the effects are more severe, or have lasted for a short time, the parts will swell and become livid, which is the second degree of chilblain. When the deranged action proceeds still further, blisters are formed, which sometimes degenerate into ulcers, attended with sloughing.

Treatment.—The treatment naturally divides itself into preventive and remedial; the former being of great importance in children, who are incapable of attending to the proper quantity and arrangement of their cloths.

Although warm clothing is necessary in winter, yet it is a well-known fact, that a great susceptibility to the impressions of cold is generated by keeping parts too warmly covered. When children are observed to have a strong tendency to chilblains, the feet, which are the parts most often affected, should be frequently rubbed. While a sudden exposure to great changes of temperature ought to be avoided, the child should be gradually inured to the ordinary vicissitudes of the climate, as one of the best preventives of this and other effects of a low temperature.

When a part appears to be frozen, the best application is snow, or water at the temperature of 32°, or at a higher temperature, poured in a stream on it; the itching and heat will thereby soon be removed. A mixture of alcohol and water in equal parts, or of vinegar and water in the same proportions, is also very useful in the first stages of chilblains. Stimulating applications appear to be the most useful in the subsequent stages of chilblains, such as spirits of turpentine, or basilicon ointment mixed with spirits of turpentine. Soap liniment, either alone or combined in equal proportions with spirits of turpentine; the latter, also, with the oil of rosemary, has been greatly extolled in the treatment of these affections, or the annexed formula.[*] When vesication has taken place, the different preparations of lead are generally used, as the poultice of lead water,[†] or Goulard's cerate.

[*] ℞ Tinct. Cantharid., ℥iij.
Linim. Sap. C., ℥ij. M.

[†] ℞ Aq. Litharg. Acet., ʒj.
Aq. Destil., ℔j.
Micæ Panis., q. s. M.

Chloride of lime has recently been used in the treatment of chilblains in every stage of the affection, both where the skin continues unbroken, and where ulcerations have formed. It has been employed both in the form of liniment and solution, and much used by the German physicians.[*]

Creosote has also recently been introduced into practice, and Dr. Herndon[†] considers the creosote ointment as the best remedy yet known for the treatment of chilblains.[‡] Excessive inflammation, or suppuration and sloughing of parts, must be treated according to the principles established in surgical treatises.

VESICATION.

Blisters sometimes become exceedingly troublesome, and even dangerous in young children, from excessive inflammation, which occasionally terminates in protracted sloughing. These effects are to be prevented by carefully watching the progress of the blister, which should only be left on from two to four hours, and on the appearance of a considerable degree of redness, by removing the plaster, and applying a little unguentum resinosum.

When excessive inflammation occurs in a blister, a soft poultice of bread and milk, or slippery elm, should be placed over it. The soothing course is decidedly the best when the constitutional symptoms are severe; and when the blistered surface assumes an irritable and ulcerated appearance, a sedative ointment, composed of lime water, oil of almonds, and simple cerate, will be the most suitable application.

After the ulcerated surface becomes pale and ash-colored, it will be necessary, under these circumstances, to use some stimulating application, as the unguentum resinosum, or a solution of the nitrate of silver, ten grains to the ounce, applied by means of a camel's hair pencil. When more stimulation is required in cases of the formation of sloughs, lotions of chloride of soda, or the yest poultice, will become necessary. The best application, in severe cases of sloughing blisters, is the acetate of copper, used either in solution, or in the form of ointment.

INTERTRIGO.

This is an erythematous affection, without any febrile symptoms, and known by the existence of blotches of various sizes, of a red color, in different parts of the body. In young infants who are fat, the folds of the skin, by causing the rubbing together of the parts that are in contact, are constantly exposed to this form of cutaneous disease. It will, therefore, be found in the axillæ, groins, upper part of the thighs, and wherever the skin lies in folds, or is wrinkled.

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[*] ℞ Calcis. Chlorid., ʒiij.
Solve in
Aquæ Destil., ℔j.
Adde
Vini Opii, ʒj. M

℞ Calcis. Chlorid.,
Boracis, aa. ʒj.
Axung., ℥j. M.

[†] Amer. Med. Intell., March, 1838.

[‡] ℞ Creosot., gtt. xxx.
Ol. Amyg. Dulc.,
Cerati., aa. ℥j.

A common cause of this disease in infants, is the continual wetting of the clothes with the urine and feces. The upper parts of the thighs and scrotum thus become the seat of a troublesome, and often an obstinate inflammation, of a bright red color, without much change in the affected part, but attended with considerable elevation in the temperature, and great itching. There is also a morbid secretion of sero-purulent fluid.

A strict attention to cleanliness, by frequently washing the part with castile soap and warm water, and often changing the wet clothes, is generally all that is required in the treatment. Where there is much discharge from the part, it may be dusted over with the ordinary flesh powder, or with equal quantities of this mixed with finely powdered oxyde of zinc, or lapis caliminaris of the shops, when the inflammation appears to be severe.

In severe cases rhagades or fissures appear, which are at times very obstinate and painful. Besides the rational means of strict cleanliness, mild ointment should be applied to the part, or a mixture of the white of an egg and olive oil, to supply the deficiency of natural mucus of the part, where the fissures are dry and hard. The powder of lycopodium has also been advised for this condition of the skin.

FROM GASTRIC DERANGEMENT DURING LACTATION AND DENTITION.

STROPHULUS.

This is very common in young infants, and has been described as existing under different varieties, according to the appearance and form of the eruption. It is characterized by a white or red papulous appearance of the skin, appearing and disappearing successively.

ETIOLOGY.—This is one of the earliest diseases of infancy, and arises from an irritable condition of the skin, produced either by the warmth or friction of the clothes, or the temperature of the season or apartment. It is, however, evidently connected with gastro-intestinal irritation, caused either by improper food, or the acid condition of the contents of the stomach from indigestion.

SEMEIOLOGY.—The eruption of strophulus has different appearances, from the color, size, and arrangement; and it has accordingly been arranged by Willan agreeably to its different appearances.

Strophulus *intertinctus* is where the papulæ are of a vivid red and prominent, with an erythematous inflammation intermingled with them. The eruption is chiefly situated on the face, arms, and back of the hands, and will often continue for two or three weeks without any evident constitutional disorder. It sometimes entirely vanishes, to reappear in a few hours. When it permanently disappears, it leaves a furfuraceous desquamation.

Strophulus *albidus* of Willan, is where the papulæ are small and white, with a slight circumscribed redness.

Strophulus *candidus* is where the papulæ are also white, but larger, and destitute of the circumscribed redness above mentioned. They are also smoother, and with somewhat of a lustre.

Strophulus *confertus* is characterized by a very thick eruption on the face, trunk, and extremities. They are nearly confluent on the face; their color is not so bright as in strophulus *intertinctus*. The eruption on the trunk is mostly confined to the loins, and is more scattered than that on the face. In both upper and lower extremities the eruption usually forms in clusters, and is attended with great itching; it may recur for a long time on the thighs and loins.

Strophulus *volaticus* is a disease of a much later period than the former varieties, depending on the greater functional derangement of the digestive organs, which arises during dentition. It is much more rare, and is attended with more febrile action and greater restlessness. The eruption appears in different parts of the body in small clusters; the pustules and the interstices are of a bright red. Their duration is but a few days, when the patches become of a yellowish brown, and separate. They, however, are very liable to appear in succession. The different varieties may at times exist together, so that it is difficult to tell which of them predominates.

Strophulus is a disease of no danger, unless complicated with great gastric derangement, gastro-enteritis, or cerebral congestion.

TREATMENT.—In general it requires but little treatment, further than allaying the itching and irritation by the application of a little vinegar and water, when these are severe. If the stomach is acid, a little magnesia will be needed, both to neutralize it and also to keep the bowels open. In more severe affections, attended with a loose state of the bowels, it will be necessary to combine a small quantity of rhubarb with the magnesia, and afterward allaying the irritation and pain in the bowels by a small quantity of the camphorated tincture of opium, or a drop of laudanum, as already recommended when treating of disorders of the bowels; the disorder, when thus complicated, requiring no difference in the treatment.

Great care should be taken of the diet; and all other food besides the mother's milk ought to be withheld. This should be particularly attended to in that form which more commonly attacks children during the process of teething, when a varied diet is in some degree adopted. The mildest of food, when it occurs toward the termination of teething, or when the child is weaned, must be carefully adhered to. Milk and arrow-root, sago, or tapioca, should form the principal part of the nourishment, while the bowels ought to be kept in a free condition. If much febrile action exists, with an evident derangement of the chylopoetic secretions, a small dose of calomel, or the hydrargyrum c. cretâ, according to the existing indications, followed by castor oil, will be needed. The warm bath, also, is a useful adjunct in the treatment, especially when there exists much disorder of the bowels. The gums should always be examined, and if found enlarged and tense, indicating the presence of advancing teeth, ought to be carefully cut.

PRURIGO.

This is a papulous disease, differing in its color very little, if any, from that of the skin, and characterized by an intense itching. It appears either on one region of the body, from which it may spread to others, or it may attack several parts at once.

The general characteristics of this disease, which has been divided into several species, from its seat, the advanced age of the individual attacked, or from some peculiarity in the violence of the symptoms, are at first a feeling of itchiness, arising from a great number of very small papulæ, scarcely differing in color from the surrounding skin. This itching increases in intensity until it is almost insupportable, and has been compared to the burrowing of a multitude of ants; whence the term formicans, given to one species of it, is derived. These papulæ are generally so slightly projecting as scarcely to rise beyond the surface of the skin. The intenseness of the itching is increased by the friction of the clothes, the warmth of the bed, or the excitement following a meal.

Prurigo attacks mostly those of a delicate skin; hence it occurs more frequently in females and children than among others. A low and damp habitation, it has been remarked, is greatly favorable to its production, especially when there is great want of cleanliness. Indigestion, arising from improper food, or food of too stimulating a nature, has also been observed to precede an attack of pruritis.

When it occurs in children it is not obstinate, but very liable to recur.

Treatment.—If it appear to be connected with indigestion, the first step in the treatment is to adopt the proper measures for the removal of the original disease. Especially should children be entirely prohibited the use of spices in their food, or wine, or other stimulating drink. At no age are the effects of stimulants so direct and so invariable in their appearance, as in childhood; fever and cutaneous eruptions quickly appearing after drinking a small quantity of wine. The condition of the bowels must be watched, and they should not be allowed to become constipated. The diet should be light and cooling, and whey or thin gruel ought to constitute the principal drinks. In severe cases, attended with evident accumulations in the stomach and bowels, and a deranged state of the secretions of the various glandular appendages of the digestive organs, an emetic will be found a highly useful remedy at the commencement, followed by a dose of calomel and neutral salts.

The local applications are of great importance in the treatment of pruriginous affections; indeed, they are indispensable to relieve the urgent symptoms so inconceivably distressing in this disease. Cold poultices, weak solutions of the acetate of lead, and soothing applications of the extract of hyoscyamus, will all be found at times necessary. A wash of acetic acid, reduced with water, will often allay the itching. Where the inflammation is very violent, it will be proper to apply several leeches around the inflamed part, and to encourage the bleeding in the usual way.

IMPETIGO.—RUNNING TETTER.

Impetigo is characterized by small pustules appearing in different parts of the body, either distinct, or collected in groups; the face is the part most frequently affected with them. At first they appear like small red spots, in the centre of which yellow pustules are found, which, breaking in a few days, discharge a yellow fluid, having the appearance of thickened honey, when dry. The discharge continuing beneath the scabs, causes them to increase in thickness. When these scabs separate, the part which they covered is left of a violet hue.

It occurs in two forms, whence are derived the specific names. When the pustules are disposed in an oval or circular form, it has been denominated *figurata;* when disseminated, it is called *sparsa.* It usually attacks children during dentition, and those of a lymphatic and sanguineous temperament at a more advanced age. In those of a good constitution the disease is generally slight, and its continuance seldom more than a month. At the period of teething, impetigo often affects the scalp, and from the influence of the hairs in this part, assumes all the forms of tinea, teigne *granulée,* of Alibert.

There is some difficulty in distinguishing impetigo from other cutaneous affections. It is not unfrequently confounded with scabies, porrigo larvalis, crusta lactea, or milk scall of infants. It may be known from the former, by the eruption being in patches, by the great quantity of ichorous fluid, and the rough and chapped condition of the skin; the itching, also, in children that are old enough to understand the difference, will be found more of a tingling nature. From the latter it may be known by the greater hardness of the scabs, and in the thinness of the secreted fluid, which, in porrigo, is thick and glutinous; the bases, also, of the pustules, are much firmer than in the latter affection.

Treatment.—This disease requires the first remedial measures to be directed to the condition of the digestive organs. After the bowels have been properly evacuated by some suitable cathartic, a proper regulation of the diet should be adopted. Sulphur is a very common remedy in this disease, but has been too indiscriminately administered. The solution of super-carbonate of potass, given with some acid in the form of an effervescing mixture, is very cooling, and well calculated to allay the irritation of the system, which uniformly exists in this disease. The addition of the extract of conium has been recommended to adults, and may, in suitable doses, be used for children. In the forming stage of this disease, emollient fomentations are the best applications; but as the disease advances, even these become distressing to the patient.

When the disease resists these remedies, it will be necessary to resort to alterative doses of mercury, in the forms best adapted to children; either the hydrargyrum cum cretâ, or Plummer's pill, with the decoction of sarsaparilla. In robust habits, a full dose of calomel followed by an infusion of senna, given occasionally, will be found a useful method of treating the disease, the secretions being thereby much more promptly restored.

When the discharge becomes profuse, the best applications are ointment of the oxyde of zinc, acetate of lead, or the white precipitate of mercury. Citrine ointment, or the red precipitate ointment, diluted with simple cerate, will also be found very useful applications, as will also ointment composed of calomel; all these mercurial preparations should be cautiously used, especially about the face, as severe salivation has occasionally occurred, even in very young children. The mercurial applications are most useful in the dry state of the eruption. The ointment of the sub-nitrate of bismuth, made with two drachms to an ounce of simple cerate, is also a useful application. In cases where there existed great irritation, the hydrocyanic acid has been used, properly diluted, with an entire relief to the distressing symptoms. Mr. Plumbe, however, found its application followed by a considerable affection of the pulse; it ought, therefore, to be used with some caution in children.

PORRIGO LARVALIS.—CRUSTA LACTEA.

This disease has received one of its names from the peculiar covering which the face undergoes, from the secretion and drying of the puriform fluid over the face, enclosing it, as it were, in a mask. It very much resembles the one just described, both as to its causes and its characteristics. The principal difference is in the size of the original pustule, and the delicacy of the skin of infants; the disease occurring at an earlier period is probably the cause.

The appearance of the eruption varies considerably; depending, probably, on the violence of the original inflammation of the skin and the constitutional peculiarity of the child. Like the eruption just described, clusters of pustules arise in some parts of the face, and these pustules break and discharge a yellowish fluid, which concretes into thin scabs at first, but which, from the constant oozing beneath, becomes constantly thicker. These clusters uniting, the scabs almost cover the entire face, with the exception of the eyelids and nose. These scabs are of a light green, or yellow color, and from beneath them an offensive and acrid fluid oozes.

The disease is at times confined to the parts behind the ears, or around the mouth, or on the forehead or scalp, possessing all the marks which characterize the more extended affection. At other times it covers the whole body and limbs, when it becomes a severe and distressing affection, from the great itching and pain which are its attendants. There is always more or less fever accompanying it, and when long continued it is very exhausting. Great emaciation invariably follows protracted cases of this disease.

The disappearance of this affection is known by the lessened secretion of pus, the thinness of the newly formed scabs, and their white appearance, and from their being followed, when separated, by a slight desquamation; which itself speedily disappears, leaving the seat of the disease shining, and of a rosy color.

It is much worse in children of a robust habit of body; and when extensively diffused over the body is excessively distressing, from the incessant itching and pain, arising from the adhesion and forcible separation of contiguous parts, occurring from the glutinous nature of the discharge; the intervals of ease permitting the adhesions to take place in the folds of the skin, and the excoriations attendant on the disease causing excessive pain, when the child instinctively attempts to relieve its distress by rubbing and scratching the part.

During the continuance of these cutaneous inflammations, it is very common for the neighboring gland to become enlarged, and perhaps inflamed; tumors, therefore, frequently form on the neck around the throat, behind the ears, etc. They are entirely independent of the existence of the peculiar temperament which gives rise to these glandular swellings under other circumstances. In the present instance, it arises from the transmission of the inflammatory action along the course of the lymphatics, and nothing is more common than to see the glands of the neck enlarged, when extensive inflammation and ulceration exist on the scalp.

Treatment.—In the treatment of this affection, our efforts must mainly be directed to the existing constitutional plethora of the child; for it is one of the salutary efforts of nature to relieve the system of its superabundant amount of fluid. It is a disease which, of itself, can not be regarded as one of hazard, but as one of a critical nature, after the existence of other internal inflammations. On this account, and from the frequent occurrence of hydrocephalus or other fatal diseases of infancy upon its sudden removal, great caution is to be observed in the use of such measures as will tend to its cure, without having previously prepared the system to bear the change. Where nurses or mothers have been induced to apply local remedies for its speedy removal, ill and even fatal consequences have almost invariably followed. It is but quite recently that a case of this kind came to my knowledge, hydrocephalus quickly following the healing up of these eruptions, and terminating fatally in a few days.

The first and most prominent indication of treatment is, therefore, to lessen the plethora, by a persevering use of diet containing less proportions of nutriment than usual. If the child be nursing, the nurse should live on lighter food than ordinary, take frequent aperients, and, if plethoric, ought to be bled. All stimulating beverages should be entirely withheld, while the lightest and simplest fluids should be the only kinds which the nurse is allowed to use for her drink. A glass of cold water will often be followed by a free flow of milk, superseding entirely the necessity of stimulating articles for the purpose of exciting the action of the mammary glands. It will also be necessary to lessen the quantity of food the child takes, if it be partially or wholly fed with the spoon, while the bowels are kept actively free by means of small portions of phosphate of soda.

This course should be kept up for a few days, and if an improvement be not made in the appearance of the disease, the secretions of the chylopoetic viscera ought to be more actively excited by a dose or two of calomel; and if the child be of a remarkably robust habit, a minute portion of antimony may be added to it, proportioned to the age of the child. The bowels may afterward be kept open by small doses of sulphur, which should be washed and freed entirely from any acidulous matter, as the latter produces the extreme griping that attends the passage of sulphur through the bowels.[*] It may be combined with magnesia for effecting the same object.[†] All these means should be persevered in to a moderate extent, so as not to induce an excessive and morbid irritability of the mucous membrane of the bowels; they may occasionally be withheld for two or three days, and then resumed. The bowels should, by these or similar means, be kept loose for two or three weeks, when the child will be sufficiently reduced to attempt the healing of the eruption by local means, if it has not already disappeared.

Frequent washing of the affected parts with warm milk and water, or with other emollients, is by far the best method of managing this affection locally; but in extremely obstinate cases it will be necessary to resort to other applications, which effect a change in the capillaries. Mercurials have therefore been resorted to, and with success; but, as was before remarked, great caution is necessary in the use of ointments, of which mercury forms the active ingredient, in sores about the face, for it is sometimes very rapidly absorbed, and inflammation and ulceration of the salivary glands very quickly ensue. Where these are found necessary, the ointment of the nitrate of mercury, reduced with simple cerate, or the ointment of calomel, as recommended by Dr. Dewees, will be found the most useful.

Sulphurous lotions have also been effectual when other remedies have failed, and are the more useful in proportion as the disease has extended over the body.[‡]

Among the remedies of a constitutional nature lately recommended for the treatment of this disease, is the syrup of asparagus; it would appear to be a very inert and inefficient remedy.

When the affection invades the scalp, it scarcely differs in its form from other diseases of this part, and requires scarcely any difference in the treatment from that adopted in the management of tinea capitis.

ERYSIPELAS.

Erysipelas of young infants is a disease of very rare occurrence in the United States, compared with some parts of Europe, especially in the hospitals, where it is a disease of great mortality. It appears to have been first noticed by Avicenna, who lived about the beginning of the eleventh century. Drs. Underwood and Garthshore have given the best account of this affection in modern times; while, for a more accurate pathology, we are indebted to Billard and other physicians of continental Europe.

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[*] ℞ Sulphuris, gr. x.—xx.
Mist. Acaciæ, ʒij.
Sacchar. Alb., ℥ss.
Aquæ Rosæ, ʒj. M.
A teaspoonful every hour, first shaking the vial, for an infant at the breast.

[†] ℞ Sulphuris, ʒss.
Magnesiæ Carb., ℈j.
Sacchar. Alb., ʒij.
ft. Pulvis. M.
Ten grains three or four times a day.

[‡] ℞ Potassæ Sulphuret., ʒij.
Sodæ Subcarb., ʒij.
Aquæ Fervent., ℔j. M.

ETIOLOGY AND PATHOLOGY.—Billard has remarked, that this disease in young infants differs from that which occurs in adults, as it is in the latter connected with some affection of the digestive organs. This is no doubt correct in very young infants; but in the few cases which I have seen, arising in infants of the age of two or three months, it was evidently connected with a deranged state of the chylopoetic viscera. This, however, can not be regarded as a disease peculiar to children: that, on the contrary, which attacks them immediately after birth, or within a comparatively short period after birth, when it appears to be more particularly dependant on the great sensibility of the skin, so remarkable in the first few weeks of life, has something peculiar in it. A large proportion of blood circulates in the tegumentary tissue at this period, and predisposes the skin to take on inflammation, upon the slightest exposure to irritating causes. There is, also, a great disposition on the part of the skin to become inflamed, from having parted with its epidermis immediately after birth; hence the contact of urine or alvine excretions is a frequent cause of this disease.

The erysipelatous affection of the trunk is of more frequent occurrence than that of any other part; and when it has appeared on the abdomen, it has been supposed to arise from the irritation caused by pulling the cord. The affection of the lower limbs is the next in order of frequency.

Of thirty cases recorded by M. Billard, which occurred to him in the Foundling Hospital, there were eighteen below the age of six months, from one day, upward.

Post-mortem examinations have revealed the existence of enteritis more frequently than of any other visceral derangement. In other instances the disease has been traced to the umbilical vein, which, with the peritoneum around it, has been discovered severely inflamed, arising, no doubt, from injury done to it when tying it, as above mentioned. Such cases are uniformly found in young infants, where the inflammation has invaded the abdomen and lower extremities; and, when arising from this cause, always makes its appearance before the separation of the cord, or about that period. The vein has, in some instances, been found in a state of suppuration, from which it seems natural to infer that in such cases the inflammation had its origin there.

In older children, there is almost always, as in adults, functional derangement of the liver and stomach, and, indeed, in them the disease can differ but little from that in adults. In young infants, being an affection principally of the skin itself, and not a sympathetic disease, its severity and tendency to disorganization must be much greater, and its danger more imminent.

Semeiology.—The first appearance of the disease is in red spots, which spread irregularly, but gradually extend from the part on which they first appear, which is usually about the region of the umbilicus or groins, until it covers the whole of the inside of the thighs and abdomen. In general there is much heat and tumefaction, with a feeling of hardness, having more the character of the phlegmonoid variety. Such at least appears to be the nature of the disease in the United States. This character is more marked in older children, when the disease is not confined to the parts just mentioned, but will more frequently occur in the superior extremities and face; often commencing with an inflammatory blush in the hands. When it extends to the neck, it is very likely to form an abscess in that part. There is great heat of skin, and apparently much suffering from itching or stinging which the disease produces, judging from the extreme restlessness and cries of the child. The pulse also indicates considerable action in the arterial system.

In very young infants, and especially among those who breathe the impure air of crowded hospitals, there is a great tendency to vesication and sphacelus. The vesicles have a livid appearance surrounding them, and the tendency to disorganization is very rapid. This form, which may be regarded as one of decided debility, and different from that above mentioned, which is the acute inflammatory disease, has all the symptoms denoting the rapid loss of vital energy in the capillaries of the affected part, which appear unable to sustain the increased action imposed on them from their constitutional weakness.

Besides these local evidences of extreme debility, the general system shows the deficiency of energy, in the absence of the full development of febrile action. There is but little heat on the surface after the first manifestation of the disease, and but little force in the pulse. This constitutional debility increases with the progress of the disease.

Treatment.—In the ordinary, or acute form, it is obvious that an antiphlogistic course is that which promises most prospect of success; but in this disease, even with the evidences of much arterial action, bleeding can not be resorted to without hazard; great circumspection will therefore be necessary, even should the symptoms appear imperatively to demand the loss of blood. When the skin is superficially inflamed in young infants, the effect bears some analogy to the influence of a burn, in rapidly exhausting the vital energies: it is therefore with great caution that any course should be adopted which is calculated to increase the tendency to debility. The bowels should be opened with some laxative, and followed by simple diaphoretic medicines, of such a nature as will not, by their nauseating effect, increase the prostration. The liquor ammoniæ acetatis is a good preparation for fulfilling the latter indication. In children two or three months of age, the disease is almost invariably attended with some hepatic congestion, and requires more active measures. A small quantity of calomel, combined with rhubarb, will be necessary for the complete evacuation of the bowels, while the union of the bi-carbonate of potash will at the same time both destroy the acid, which almost always exists in the stomach of young children in excess, and will, by its sedative effects, allay the irritation of the mucous membrane of the stomach and bowels.* The operation should be promoted by enemata. Mr. Lawrence advises calomel and James's powder, in the proportion of one fourth of a grain of the former with a sixth of a grain of the latter, three or four times a day. Where there is much prostration, it is evident that antimony in any form should be avoided. In the acute or phlegmonoid erysipelas, this objection, however, does not exist, especially in the mild form of James's powder. Dr. Eberle is of opinion that emetics would be a useful course to adopt in some instances in this disease, from having seen the good effects which followed the accidental operation of calomel and ipecacuanha in a child about a month old. When there is much excitement, and attended with an evident morbid state of the biliary secretion, an occasional mild emetic will unquestionably be useful, but is hardly admissible in the disease, as it occurs in very young infants, in whom it is generally local in its origin.

With respect to local applications, great difference of opinion exists. Burns considers the application of cold water as the best to allay the inflammation, and that the danger arises from the constant application of very cold water, whereby a dangerous metastasis, or extreme local debility, is produced. Drs. Eberle and Dewees consider such a course as generally inadmissible in this form of inflammation, and regard the use of saturnine washes as a measure of doubtful utility; the latter, especially, recommends the tincture of camphor as the best application. This is unquestionably the best that can be used; for simple erysipelatous inflammation will not endure either the sudden abstraction of heat nor the sedative effects of lead. The evaporation of the spirits will lessen the heat, while the gently stimulating qualities of the camphor modifies the debilitating effects which would arise from the too great depression of the local action.

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* ℞ Hydr. Subm.,
Pulv. Rhei, ăă. gr. vi.
Potassæ Sup. Carb., gr. xii.
Sacchar. Alb., ʒj. M.
Divid. in Pulv., No. xii.
A powder every three hours to a child of two months, until an effect is produced.

Blisters, as recommended by Drs. Physic and Dewees, I have used with decided advantage when the inflammation was spreading, by applying them near the margin of the affected part on the sound skin. They appear to act by producing a new action in the capillaries of the part, and also by the local depletion from these vessels. Mercurial ointment has also recently been used, and Dr. Dewees speaks of the good effects which have followed its application, and directs it to be applied to the inflamed margin and a portion of the sound skin during the stage of inflammation, and also during the period of vesication, first taking the precaution of opening the vesicles. The ointment is applied to the sound skin when the blisters have opened of themselves, and become encrusted with a scab, or where parts of the affected skin have suppurated. Where there is a tendency to sloughing, the application of yest, or chloride of soda, in the form of a poultice, or a decoction of bark, may be used in the same manner.

During the process of sphacelation, the strength of the child must be supported by tonics, and the sulphate of quinine appears to exert a more beneficial effect on children than tonics of any other description, probably from the rapidity of its action. At the same time the excess of irritability must be controlled by the administration of some anodyne, as a drop of laudanum, repeated as occasion may require. The carbonate of ammonia is recommended by Burns as highly beneficial in this disease, when attended with great prostration. Untoward symptoms arising during the progress of the disease, must be treated according to the principles already laid down when speaking of other affections of children. Diarrhœa should be immediately arrested by proper absorbent and anodyne remedies. For a young infant, a week or a fortnight old, the following prescription may be used.[*] Wine whey ought at the same time to be given to the child when much prostrated.

JAUNDICE.—YELLOW GUM.

This is a yellowness of the skin, which comes on three or four days after birth, and in the greatest number of instances, without

[*] ℞ Cretæ pp., ʒij
Tinct. Opii., gt. x.
Syrup. Simplicis., ℥ss.
Aquæ Anisi., ℥j. M.

A half a teaspoonful every two hours until relieved. The dose may be increased according to the age of the child.

any indisposition. Under these circumstances it is independent of any hepatic derangement, but arises from some alteration in the serum of the blood, analogous to the change which is observed to take place in a bruise, when the more limpid parts of the effused fluid have been absorbed, leaving the coloring matter of the serum behind; or to the simple increase of the natural color of the serum, perhaps from the bile. This opinion is held by Sauvages, Cullen, Billard, and others. It has been, on dissection, noticed that other parts of the body, besides the skin, are tinged with yellow, such as the brain, kidneys, muscles, and cellular tissue, although the external teguments are the most ordinary seat of the affection. The orange color, which characterizes the disease, follows the high red so common in young children, in a very gradual manner, and according to M. Billard, is the intermediate hue between the primitive red and the delicate rosy hue, or the permanent white of a child's complexion. It may be observed to exist when the finger is pressed on the skin so as to remove the blood; the skin then exhibiting a yellow tinge instead of white, showing its dependance, in some degree, on the quantity of blood circulating in the tegumentary tissue.

This form of jaundice is very short in its duration, and scarcely requires any treatment; for the infant exhibits in general no indisposition beyond this simple alteration in the color of the skin, the digestion being unimpaired, and the alvine discharges containing a sufficient quantity of bile. So common is it to newborn infants, without any manifestation of sickness, that it has been regarded as natural to man, and a condition arising from the necessary changes which the circulation undergoes at the time of birth.

This, however, is not the case with the other form of the disease, which may, in strictness, be called jaundice. In this there is a yellowness of the tunica sclerotica, which in the former does not exist. There are, also, indigestion and absence of bile in the stools, some degree of drowsiness, and in severe cases, more or less fever. When, therefore, these symptoms exist, and there is also a yellow tinge in the excretions, it will be necessary to resort to therapeutic measures, the disease being essentially different from the former. It therefore requires a more particular notice of its causes, symptoms, and treatment. For a full description of infantile jaundice we are indebted to Dr. Baumes,* who has given the most correct account of the affection. Before his time the ideas of its nature were very vague and indistinct; but his investigations have shown that it is produced by various causes which very materially control the treatment.

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* Traité de l'Ictére ou Jaunesse des Enfants, par G. B. T. Baumes, M. D.; Paris, 1805.

ETIOLOGY.—The causes of jaundice in young infants are various, but the most common is the retention of the meconium. Next to this is the irritation from indigestion of milk, and the presence of the curds and other results of chemical decomposition, spasm or malformation of the bile ducts, viscid condition of the bile, the sudden impression of cold air on the skin, producing congestions and inflammation of the liver. Various other causes have also been assigned for the production of this disease, which it is needless to mention. Some are only remarkable for their fanciful hypotheses, such as the putrefying of the blood in the umbilical cord. It has been supposed also to arise from the compression of the brain in long and tedious labors. But it is more probable that the arrest of the circulation through the cord during difficult labors, has produced a congested state of the liver. This cause may be suspected when the child has been born with the usual appearance of a general congestion of the system, and an arrest of the circulation, causing a livid condition of the whole surface of the body, and the usual symptoms attending asphyxia. It is certain that proper nourishment is one of the best preservatives from infantile jaundice, for it is ascertained that by far the greatest number of those attacked are such as have not the advantage of the mother's milk, but are suckled by hired nurses.*

SEMEIOLOGY.—In jaundice, the skin, conjunctiva, tongue, and mouth, all present the peculiar hue which distinguishes this disease, and dissection has traced it to the cellular tissue, and even the abdominal viscera. The color varies from a bright to a greenish yellow, while the urine is tinged with the same, and the linen died with a saffron color. The alvine discharges, also, contain at times a superabundance of bile, and again are whitish, and destitute of the usual coloring matter; both conditions showing a derangement in the action of the liver, or a morbid condition of the duct transmitting the bile.

These are the general symptoms of jaundice; as to the others, they vary according to the cause producing them. When it arises from a spasm of the gall ducts, it appears suddenly, with tenseness of the abdomen, nausea, and pains bearing some resemblance to colic. Pain in the right hypochondriac region, with enlargement, great restlessness and fever, are the accompanying signs of jaundice from inflammation of the liver. A torpid condition of this organ may be known by the gradual enlargement of the region which it occupies, without much accompanying fever, a defective appetite, slowness of the bowels, and emaciation.

From the causes, which have all their peculiar signs, may the prognosis be formed with some degree of accuracy; for if it be connected with the simple alteration of the serum, as is noticed above, constituting the yellow gum of children, it needs no interference of art, for it will uniformly disappear of itself. So, also, if it appear to depend on the retention of the meconium, or on the presence of partially digested milk, or any other simple irritating cause, it will easily be removed, and can not be regarded as a disease of danger. On the contrary, it is attended with much more danger when arising from a spasm or inflammation of the bile ducts, or inflammation of the duodenum or liver; indeed, it is under such circumstances alone that the disease can be regarded as one which may become fatal to the child.

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* Capuron, Op. Cit., p. 201.

TREATMENT.—The treatment of this disease of course varies according to the nature of the cause. If it arise from the simple retention of the meconium, a small quantity of castor oil will be necessary to remove it, and will be all that the disease will require. If it persist, and if attended with the ordinary symptoms of infantile indigestion, it will be necessary to change the nurse, should the child be nourished by a wet nurse; or her milk may be rendered slightly purgative by the use of mild saline cathartics. The frequent use, also, of manna, will tend to the removal of the irritating cause of this affection. It is a mild and unirritating laxative, admirably calculated for young infants, and may be given to them dissolved in milk or whey. A strict and close attention to the diet of the nurse will be absolutely necessary, for the proper management of the disease, when it is evidently attended with acidity, colic pains, and curdy stools. All crude and ascessant articles of food must be prohibited; and especially all spirituous potations, as milk-punch, beer-posset, etc., so frequently resorted to for the purpose of increasing the quantity of the milk. One great cause of disordered digestion, from the bad qualities of the milk, is the anxiety arising from mental distress. A nurse, depressed by grief or uneasiness, can seldom afford proper nourishment for the child; hence the great danger arising from employing hired nurses, whose necessities alone compel them to resort to the task of suckling infants. This is one of the strongest reasons for a mother to shun, if it be possible, the danger that may arise from having a substitute. No law of our physical nature can be broken without endangering our physical existence. In infancy, where the closest observance of these laws is the most necessary, an infringement of them is attended with proportionate hazard.

In connexion with this, alkalies will also be found beneficial not only in correcting the acidity which uniformly attends indigestion of infants, but also in soothing the irritated mucous membrane of the stomach and bowels. The sesqui-carbonate of potash is particularly beneficial in allaying the morbid irritability of the mucous membrane of the stomach and duodenum, for experience has often satisfied me that it exerts a decided sedative effect on this irritated membrane, while the peristaltic action is not arrested. It may be given in doses of from two to ten grains, two or three times a day, combined with mucilage, a little sweetened. This will be the most convenient form of administering it to young infants.

Besides simple indigestion, the disease will be at times connected with an inflamed state of the gastro-duodenal mucous membrane, which is but the sequel of ordinary functional disorder; and when the disease has terminated fatally is uniformly found to exist, together with an inflamed and tumefied condition of the bile ducts. This state may, with careful examination, sometimes be ascertained, although it is in general a very difficult thing to make an accurate diagnosis in young infants in a disease of this nature. The preceding symptoms, the persistence of the disease, together with the manifestations of pain on repeated attempts on pressure to discover the precise seat of the irritation, will enable the physician to form a reasonable presumption of the existence of inflammation in the neighborhood of the duodenum. Where this inflammation is present there is also more or less sickness, with vomiting of thin mucus, together with the undigested milk. The treatment under these circumstances need differ but little from that just recommended, with the addition of a small blister over the epigastric region.

A higher degree of inflammation, and the extension of it to the liver, will be marked by the presence of a much greater degree of fever. When this exists, a few leeches may be applied to the anus, or over the right hypochondrium, followed by a soft poultice. The general restoration of the secretory function of the skin may also be attempted by the use of the warm bath. Calomel and ipecacuanha will be necessary in this condition of the system, to control the inflammatory and febrile action; the direct effects of these agents over the secretions make them important means, when combined, to overcome the inflammatory action of the liver and the accompanying fever.* The administration of these powders should be followed by a suitable dose of castor oil, or a common enema. This course must be steadily pursued, until the secretions of the liver and intestines are fully affected, and the alvine evacuations exhibit a healthy secretion of bile. In great irritability of the stomach, forbidding the use of calomel and ipecacuanha, mercurial ointment may be applied to the skin covering the region of the liver. In the tender condition of the skin in infancy, this method of applying mercury externally is better than either friction or by means of a plaster, which must be made to adhere before any advantage can be derived from it, thus causing great cutaneous irritation, and probably excoriation. Mercury in some form must be our main dependance in the management of this variety of jaundice, assisted in its operation by some mild laxative.

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* ℞ Hydr. Subm., gr. ij.
Pulv. Ipecac., gr. j.
Sacchar. Alb., gr. x. M.
Divid. in Pulv., No. vi.
One powder every two hours.

In cases connected with a torpid condition of the liver, known by the gradual progress of the disease unaccompanied by any fever, but attended with an enlargement of the right side, and the absence of bile in the stools, emetics have been advised, to rouse the action of the hepatic system,[*] and relieve the congested condition of the liver by determining the blood to the surface. This course, however, is rarely necessary in young infants, as the object can be accomplished in another manner, without the risk which will attend the action of an emetic, should an error in the diagnosis occur, and the affection be in reality connected with an inflamed state of the duodenal mucous membrane. The nice discrimination is a very difficult matter in infants, and an error had better be committed on the safe side. The free employment of calomel will be applicable to the congested and torpid condition of the liver, and the warm bath will essentially aid in the relief of the internal congestion. A mild emetic will nevertheless be useful, where there exists unequivocal evidence of the absence of an inflammatory action. The syrup of ipecacuanha will be the best for this purpose.

In those cases attended with violent colic pains, tension of the abdomen, and other evidences of spasm of the bile ducts or of the small intestines, the warm bath, emollient fomentations, with antispasmodic enemata, consisting of a weak infusion of poppy-heads or assafœtida, will be among the most useful remedies.[†] Frictions with the hand over the abdomen will also, under these circumstances, be attended at least with a relief to the urgent symptoms. Anodynes and antispasmodics, as recommended for colic, will also be necessary, provided they do not interfere with the action of laxative medicines. A regular action of the bowels, and a strict attention to the state of the digestive organs, especially the destruction of the acid contained in the stomach, is the most proper course to be adopted in chronic cases. In such cases, also, the leontodon *taraxicum*, or dandelion, has been found to be a very efficacious remedy, and has been long in use, from its influence over the biliary secretion. In spasmodic cases it may be combined with an infusion of hops. For the purpose of preserving the free condition of the bowels, it should be combined with some laxative, as in the subjoined formula.* It is a very valuable medicine, and is useful in relieving abdominal congestions, from its action on the biliary and urinary secretions, on which protracted jaundice often depends.

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[*] Eberle, Op. Cit., p. 104.

[†] ℞ Assafœtidæ, gr. vj.
Infus. Anthemidis, ℥j.
Acaciæ, q. s. M.
Sit enema.

FROM GASTRO-ENTERIC IRRITATION AT ALL PERIODS.

URTICARIA.—NETTLE-RASH.

Urticaria is an exanthematous inflammation, characterized by the eruption of small spots or wheals, transient in their duration, either paler or redder than the surrounding skin, resembling, both in appearance and the sensation they produce, the stinging of nettles. Urticaria is generally preceded by some febrile symptoms, which, in severe cases, are continued through the progress of the eruption.

There are several species of this disease, which it is unnecessary here to enumerate, as works devoted exclusively to diseases of the skin will necessarily be consulted, where full information is sought on the subject. It will suffice to refer here to those forms which are common to children, and by a consideration of their cause, simplify the subject, to bring it within the scope of the present work.

The first symptoms of common urticaria, arising from indigestion, in consequence of eating certain fishes, mushrooms, honey, various kinds of fruit, usually show themselves in an hour or two after the ingestion of the substances causing the disease. There are at first much nausea, weakness, and giddiness. The skin is burning hot, when blotches of a whitish appearance, of different sizes and shapes, appear on the shoulders, loins, arms, and about the knees. These elevated spots are surrounded by a red areola, and are extremely distressing, from the incessant itching and stinging sensations they produce, which are greatly increased in bed.

In severe cases these spots are often preceded by vomiting, and sometimes by purging. These symptoms usually attend urticaria from the ingestion of poisonous articles of food, and of some medicines; and usually occur in older children, in whom the causes and symptoms are similar to those occurring in adults.

There is another form, which is occasionally attended with fever, not unfrequently attacking children that are teething. It often continues a long time, with symptoms like those already mentioned;

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* ℞ Ext. Taraxici, gr. xx.
Conf. Sennæ,
Sodæ Sesqui-Carb., āā. gr. v.
Aquæ, ℥j. M.
A teaspoonful three or four times a day.

but the eruption may suddenly disappear, so that it is difficult to discover anything of it on searching over various parts of the body. It will, however, as quickly reappear, sometimes in the same place, and sometimes in another, without any assignable cause. In these instances it is unattended with vomiting or purging.

The latter form, besides the irritation of the system produced by teething, appears to depend on a chronic disorder of the digestive organs, or on an inflammation of the mucous membrane of the stomach, in children who possess much of the sanguineous and nervous temperament. It will, therefore, be found to be occasionally a very protracted affection, lasting for weeks, and even for months; disappearing altogether for a day or two, and appearing again on the slightest excess of food, or a sudden exposure to a change of temperature.

TREATMENT.—Where the disease has been produced by the ingestion of some poisonous substance, its immediate ejection by a mild emetic, assisted by warm fluids, is needed. Nature generally excites vomiting, and frequently purging; the former should be promoted by copious draughts of warm water, until the offending substance has been entirely removed. A sufficient dose of castor oil ought also to be given, that the bowels may be freely moved. It will, for the most part, entirely disappear on the removal of the irritating cause; but a warm bath may sometimes be required to assist in restoring the proper secretory action of the skin.

In the other form of the affection, where it is independent of the action of an irritating substance received into the stomach, an examination for the cause will be necessary, as it may arise from different conditions of the stomach, as well as from the irritation of teething. Sometimes it is attended with much fever; the state of the fauces and epigastrium should then be examined by gentle pressure, if the former be found inflamed and the lätter tender; or if one or the other states exist, an inflammation of the mucous membrane of the stomach is doubtless present, and the case should be treated either by bleeding from the arm, or by the application of leeches over the region of the stomach. The food ought to be restricted to the mildest and least irritating kind, while the bowels are kept free by emollient enemata. As a local application, vinegar and water, or a solution of the sub-acetate of lead, will be the best to allay the itching and stinging pain attending the eruption. The latter, however, should be cautiously used, as the surface affected is generally extensive, and a free use of it would perhaps be attended with very serious consequences. In teething children the gums must be examined, and if swollen, freely cut.

Besides an inflammatory condition of the gastric mucous membrane, a constant state of irritation from the presence of acid, or the uninterrupted use of some one article of diet, may keep up the disease for a long time. A little careful attention to the symptoms will detect the presence of the former; and an entire change in the diet of the patient will not only discover the cause of the long continuance of the disease, but will also prove the best remedy for its removal. A regular condition of the bowels should be preserved by the use of magnesia, or magnesia and rhubarb, and the superabundant acid be neutralized by frequent use of alkalies.

LICHEN.

Lichen scarcely, if ever, occurs in infants at the breast, but is peculiar to children from five years and upward, and also to adults. It is a papulous disease, and characterized by a successive eruption, of a reddish color, in different parts of the body, and, occasionally, by its simultaneous appearance over all parts. It generally terminates in a furfuraceous separation of the cuticle.

Several forms of this disease are described by authors, but their essential features are the red and inflamed papulæ, which, in the simplest form, appear on the neck, face, and arms, either attacking these parts simultaneously, or spreading from one to the other. It is generally very troublesome, from the tingling or itching sensation it produces, but is rarely attended with any febrile action.

The most common form of lichen among children is the lichen *tropicus*, or prickly heat, which, indeed, includes all the others, but modified by atmospheric heat. It appears always to be attended with an excited state of the liver, so common in warm seasons. The eruption which appears in the heat of summer consists of a great number of small circular papulæ in different parts of the body, but more especially on the back of the neck and shoulders, greatly increased in redness when the circulation is excited from any cause. It is never attended with danger, unless suddenly arrested by the application of cold. The itching and restlessness it occasions are extremely annoying, often utterly depriving the child of all sleep, and increasing when the child is warm in bed.

Treatment.—The cooling system is the best method of treating prickly heat. Everything of a heating nature must be avoided; the clothes should be light, and all exposure to the sun and heat ought to be carefully avoided. This, with some mild purgative, will, in the greatest number of instances, be all the treatment required. Where the disorder is of great severity, cooling washes of vinegar and water will be found to allay the extreme itching. Acidulated drinks, ought, also, to be liberally used in older children. The common beverage of cream of tartar affords an excellent cooling drink, gently affecting the bowels, and when sweetened sufficiently, is very acceptable to children. It is rarely necessary to resort to any other measures for the relief of this disease; but if it should increase in intensity, or if coma or other evidences of internal congestion appear, the system must be relieved by bleeding, and the warm bath must be resorted to.

ROSEOLA.—ROSE-RASH.

This is a superficial inflammation, often bearing a great resemblance to other inflammations of the skin, and not unfrequently an attendant on other eruptive diseases, as variola, vaccinia, etc.

The inflammation is characterized by the existence of patches of irregular rose-colored inflammation, attended with great itching. It is rarely followed by a desquamation of the cuticle.

It is very common in infants; attacking them mostly in the summer and autumnal months, and arises principally when they are teething, and appears to be at times connected with an acid or irritable condition of the bowels.

The duration of roseola is generally short; but in this respect it often varies, while it appears and disappears several times in the course of the day. There is at times fever attending it; but in the greatest number of instances there is neither fever, nor any other derangement of the digestive organs, than the presence of a slight acidity.

Treatment.—It scarcely requires any other treatment than incising the gums, a proper attention to the condition of the primæ viæ, and the preservation of the skin cool during the hot months. When complicated with other affections, these demand the principal attention. Cerebral congestion is the one most to be apprehended, and must be met agreeably to the generally established principles laid down for its treatment.

Salt rheum ECZEMA. or

A vesicular inflammation, known at its commencement by the existence of small vesicles closely crowded together, accompanied with considerable tension, and a circular redness of the skin, characterizes eczema. The fluid they secrete is sometimes absorbed, and sometimes exuded by a rupture of the vesicles: a continued oozing then takes place, forming superficial scabs; the epidermis is at the same time extensively destroyed. When these scabs are thrown off, the part which they covered exhibits a pink hue; a new crop of vesicles forms in their place, following the course of that which preceded. This eruption shows itself in a distinct form, on the face, limbs, and upper part of the thighs.

Eczema often becomes chronic in its character, when the different layers of the skin are involved. The inflammation is then severe, and deep chaps are sometimes formed in the skin. It is more common, however, to find an increased quantity of sero-purulent matter secreted, having the appearance of a blister in a state of suppuration.

In chronic cases where the inflammation is not so great, there is less sero-purulent matter formed; the scabs are, at first, moist and thick, and are immediately reproduced after being detached, but become thinner, and assume the form which has been described under the name of *dartre squameuse*.

In the first-mentioned chronic form it is a disease of great obstinacy, there being a continued succession of vesicles multiplying and blending together, and a great abundance of secretion; the itching and distress are intense, and great emaciation and derangement of the digestive organs accompany it, very seriously undermining the health of the patient.

This disease much more commonly attacks youth and children at the age of three or four years, than infants, although the latter have been known to be affected very shortly after birth, when the disease is not unfrequently mistaken for a syphilitic eruption. In newborn infants it is also apt to appear around the umbilicus. It also appears during the time of teething. It is very common for this disease to alternate with an inflammation of the mucous membrane of the stomach, or to exist simultaneously with this condition of the part; and an inflammation of the mouth, bearing the characteristics of eczema, is not uncommon in children.

Treatment.—When eczema occurs in the face and head, it is decidedly a salutary eruption, especially during dentition. It will, therefore, be hazardous to attempt its removal in any other way, than by relieving the state of the system on which it appears to depend. The gums should be freely cut where there exists evidence of the pressure of the protruding teeth. As it is connected with a disordered state of the digestive organs, a change of the nurse has been known to effect a cure. In older children, a strict attention to diet will be requisite, while small doses of some mercurial preparation will be necessary to unload the congested viscera, and to preserve a free secretion from the chylopoetic viscera. Purgatives, also, form an important class of remedies in the treatment of eczema of children. As to local applications, there is nothing so effectual as a solution of alum applied to the parts where the vesicles are about rising, the whole of the subsequent condition depending on these vesicles, which appear to be connected with a relaxed state of the capillaries; if they are arrested in their formation, the subsequent stages do not take place. This, or some other astringent wash, I have found the best application in the treatment of the incipient stage of the disease. Mr. Plumbe recommends alum, the acetate or sulphate of zinc, or spirituous lotions, as the best remedies in the relaxed state of the vessels after the long-continued excitement, and condemns every description of greasy application. The sulphur baths, in every form, I have tried without any success whatever; sulphur internally, also, without any benefit. Tepid sponging of the body is very useful after the scabs are formed, and assists in their removal; but no other advantage appears to be derived from its use.

Where there is much pain, fomentations of the decoction of flaxseed or marshmallows will be found beneficial, and particularly if a small quantity of poppyheads be added to the decoction. One of the most troublesome forms of the disease is where it attacks the genital organs. Owing to the extreme sensibility of the part, these emollient applications are extremely soothing, and especially fomentations composed of milk and water. The hip bath, also, will afford great relief in cases of this kind, especially when extending over the nates. Emollient poultices are also useful to soften the indurated scabs, which, from their mechanical irritation, greatly add to the existing inflammation.

In those chronic cases where the disease only passes through its stages of vesicular formation and desquamation of the cuticle, gentle stimulants have been used with advantage, in order to change the action of the cutaneous vessels. Solutions of nitrate of silver, sulphate of copper and diluted muriatic acid, have been used for this purpose. They are not, however, to be rashly used, without a full trial of those that are of a soothing nature. Ointments, composed of the oxyde of zinc, or the proto-chloride of mercury, have also been employed with advantage in such cases, when protracted.

HERPES.

This is an eruption of a number of vesicles, of different sizes, from the most minute, situated upon a red or inflamed surface. They are seen on the lips of persons recovering from an attack of fever, which are on that account designated by the specific term labialis. These vesicles afterward present an excoriated surface, which is covered with a yellowish scab, and are found in various parts of the body.

The attention is first directed to the part, from the existence of a heated or tingling sensation. The part, on examination, exhibits a slight redness, in the midst of which several small vesicles appear. Near to this will be found another small patch of redness, and another cluster of vesicles. Thus, several will be found in slightly different states of advancement. These vesicles in a short time mingle together, shrivel, and degenerate into scabs of a brown color. In a week or fortnight the scabs fall off, leaving the skin tender and red. A succession of these clusters of vesicles sometimes appears in an irregular line, which, when it occurs on the body, apparently surrounds it in the form of a belt; whence the term shingles, from ceingle, is derived—herpes zoster of nosological writers. Other differences occur, which it is unnecessary to particularize in this work, as the disease is not peculiar to children, although some of its forms are met with, even in infants, in common with adults. The circular form known as the ringworm, is probably that which is of most frequent occurrence in children.

Herpes is difficult to cure; and, indeed, it is hazardous to attempt to repel an eruption, which, for the most part, has been preceded by some febrile action, and often appears to be critical. The violent heat and itching may be relieved by soothing and sedative applications, such as solutions of acetate of lead, with a little opium, where these are great, or emollient fomentations. A constant attention should be paid to the condition of the bowels; and frequent saline cathartics ought to be administered, while the diet should be of an antiphlogistic nature.

In long-continued local diseases of this nature, where there is but little constitutional affection existing, as in the common ringworm, after the administration of a cathartic, and the proper regulation of the diet, stimulating applications may be used: such as the escharotic juice of the walnut, or a decoction of dulcamara, or of any of the species of rhus or sumac. For effecting the same object, a solution of the sulphate of copper, or the yellow wash, has long been in use, and is highly useful in removing these slight affections, which are frequently unattended with the presence of many vesicles.

PURPURA.

An extravasation of blood beneath the cuticular surface, is the characteristic of this disease. Sometimes it appears in the form of minute spots, resembling the punctures of small insects, which vary from this size to half an inch in diameter, denominated purpura *simplex*. These are at times preceded by circumscribed spots or wheals, resembling urticaria; hence the variety purpura *urticans*. Any form of the disease, when severe, may terminate in hemorrhage, constituting purpura *hæmorrhagica*.

Etiology and Pathology.—Purpura is in general connected with a debilitated state of the system, although it has at times been found to be dependant on an opposite condition. It will, therefore, for the most part exist where the constitution is impoverished for the want of proper food; hence it is most frequently found among the children of the most impoverished. Any derangement of the digestive organs, by impairing the quality of the chyle, and thereby affecting the constituents of the blood, will, in some constitutionally predisposed children, produce this affection with remarkable quickness. I once knew a child of three years of age, who was suddenly covered with dark purple spots in the midst of the wheals of urticaria, from eating inordinately of Indian corn. They appeared with all the suddenness which so often marks the eruption of urticaria from undigested food. From the influence of the absorption of bile into the system, thus depriving the food of the mixture of bile, whereby the due elaboration of chyle does not take place, the same condition of the blood occurs; hence it has been seen to accompany jaundice, of which complication Dr. Elliotson has recorded two cases. That this is the pathological condition, appears from a case which I recently saw in an infant, who died at the age of six weeks, after a severe jaundice, accompanied with hemorrhage from different parts of the body from small spots, without any abrasion of the skin, where dissection revealed the entire absence of the gall duct, so that no bile whatever was received into the intestines.

From the analogy of the disease to scurvy, and the fact that children who are much fed on salted meat or fish, as is noticed by Dr. Graves,* and that those who live also in damp, close, and impure places, and the connexion of the disease with a deficient supply of bile into the intestines, all of which derange the digestion, it would appear that the blood undergoes a change in the proportion of its constituents.

TREATMENT.—The first step in the treatment of this disease is to change the diet. If it appear in a young infant, the quality of the milk may be suspected, and the nurse ought to be changed, or an artificial mode of nourishment substituted. Where it is attended with a febrile condition, or is evidently connected with irritating undigested substances in the bowels, some mild aperient may be given, as a little rhubarb and magnesia, or castor oil. In the same condition of the system which invariably attends the combination of urticaria and purpura, more active medicine may be required, especially where the liver is involved in the disease; a full dose of calomel, followed by an aperient, will then be needed. When complicated with jaundice, the original affection will demand our principal attention.

As the disease for the most part is attended with debility, and connected with impoverished food, a more stimulating and tonic course of diet will be needed, while the alvine evacuations are so ordered that one free motion is obtained in twenty-four hours. When there is absence of fever, the aperient may be slightly tonic and alterative, such as rhubarb, combined with aromatic powder.[*] If great debility exist, sulphate of quinine, or the infusion of cascarilla and colombo, will be found far better than the nitric acid, or any of the mineral acids so frequently resorted to in this affection, which greatly disorder the stomach and bowels of young children. The local application to bleeding parts should be of an astringent nature, and a solution of alum offers the best that can be used for arresting the hemorrhage. In the latter stages of the disease, blood is often constantly oozing from the gums. Dendy recommends turpentine, as in the following prescription for this and similar affections, in other parts of the mucous epithelium.[†] The proto-ioduret of iron has been found by recent experience of Dr. J. W. Francis, to be a highly valuable remedy, when given in combination with the watery extract of Peruvian bark.

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* Dublin Medical Journal, vol. iii.

FURUNCULUS.

Boils are not common in infancy, but are often seen during the period of youth in such as are of a plethoric or robust habit of body. They also occur from some irritation of the skin, arising from external causes, such as the use of irritating ointment, or the application of a blister, the irritation also of extensive cutaneous inflammation, as small-pox. It is not unusual for them to arise on the disappearance of other diseases; and, as they are occasionally connected with a slight derangement of the digestive organs, they probably owe their existence at this time to an over-excited state of the digestive mucous membrane attendant on the increase of its functions during convalescence.

A boil or furuncle is an inflammatory tumor, of a circumscribed and conical form, hard, red, hot, and painful. It occupies the skin and cellular substance, and is seated in the conical prolongations of the sub-cutaneous cellular tissue, which proceed from the inner surface of the skin to the external, where they form the papillæ and vascular rete, with the vessels and nerves which accompany them.

The symptoms are at first such as have already been mentioned above; and the hard nature and bright red color of the tumor are evident on its first appearance, even when its size is no greater than that of a small pimple. It is attended with violent pain, like that produced by the introduction of a large needle through the skin. In about a week the apex changes to a white color, and breaks, discharging a small quantity of bloody purulent matter. A slough is seen arising from the bottom of the cavity, which is known by the name of the core; while this remains the boil will never heal. This slough is usually discharged about the tenth day, when the boil gradually heals. Boils are rarely attended with fever, unless they are very numerous.

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[*] ℞ Pulveris Rhei, gr. xv.
Hydr. c. cretâ, gr. vi.
Pulv. Aromatic., gr. iv. M.
Divid. in Pulv. No. vi.
One three times a day, to a child three years of age.

[†] ℞ Ol. Terebinth., ℥ss.
Ol. Ricini, ℥iij.
Pulv. Acaciæ, ℥iij.
Aquæ Anethis., M.
ft. Haust.
For a child of ten years of age.

Treatment.—It was formerly the custom to attempt the removal of boils by the application of caustic, but this method is rarely successful; and the most efficient way of managing them is to promote their softening, and bring them to an early termination by means of emollient fomentations and poultices, which may be mixed with an infusion of the extract of poppy in hot water, when there is much pain. Poulticing is the only effectual method of curing boils; for when once formed, they will always pass through their natural stages, and this process may be hastened by the constant application of warmth and moisture. When they are slow in breaking, they may be opened with a lancet. When boils are numerous, and return frequently, attention to the primæ viæ is indispensable; and brisk purgatives, and where the tongue is much loaded, an emetic will be needed to remove the accumulations which are invariably present under such circumstances.

PSORIASIS.

Psoriasis is a disease which was first described under this name by Dr. Willan, and arises from a disordered action of the vessels secreting the cuticle. It is a rough and scaly condition of the cuticle. These scales multiply rapidly, and have an irregularly circumscribed surface, and run into each other. They appear on all parts of the body, but more particularly on the face, trunk, and head. Through the cracks which sometimes appear in those scales, the reticular tissue may be seen of a red tint.

This disease, in its various forms, may attack children at all ages, without any difference in the appearance from that exhibited by adults. Psoriasis *guttata* is the common form, and known by the appearance at first of small hard elevations, whose summits are covered with white scales; these are diffused with interstices of different extent. When they assume a spiral form, they are denominated psoriasis *gyrata;* and *diffusa*, when they increase, spread, and mingle together. One variety, which resembles the bark of a tree covered with lichens, has received the specific name of *agria*, and is the same as that described by Alibert under the title of dartre *squameuse lichenoide.*

The disease, when it appears in newborn infants, has received the name of *infantilis* from Willan. On this account, and from its extreme obstinacy, it has been regarded as a syphilitic eruption. It appears in children from the time of birth to the age of two or three years, and is for the most part found among the poor, where bad diet and uncleanliness are combined.

TREATMENT.—The treatment should be commenced with a close attention to the diet of the child, which ought to be nourishing and suited to its age. A free exposure to the fresh air, also, should form a part of the hygienic treatment; while the warm bath must be daily in use until the irritation of the skin is relieved and the scales removed. These, in general, will be all the treatment needed; but if there appear to be much derangement in the secretions of the chylopoetic viscera, small doses of hydrargyrum c. cretâ should be employed, to promote a more active secretion from the various organs of the digestive system. This is far better than to resort to active purgation; for, in general, a change of diet or nurse, and a particular attention to cleanliness, are all that is needed.

PORRIGO FAVOSA.

This is a pustular disease, occurring in different parts of the body, and distinguished, as its name imports, from affections strictly of the scalp, as it denotes the occupation of other parts of the body by the disease. The pustules are small in size, flattened at the top, and when the oozing concretes, form scabs resembling the honeycomb. When it occurs in the scalp, it is denominated tinea *favosa*, and then partakes of all the local peculiarities of cutaneous affections of this part. The pustules, are large, soft, and slightly inflamed at the base, and consist of favi or achores, occupying the head, trunk, and extremities.

An attention to the general health of the patient is the first step in the management of this disease. Depletions and alteratives will be needed at the commencement, although a general tonic course has often been found necessary. The latter plan, in long-continued cases, will become the proper method of managing it, or where, perhaps, at the beginning of the disease, no other course could rationally be adopted than a gently depleting one. Mr. Plumbe states, that he saw a number of cases in a family of distinction, the children of which had long been suffering from that disease, which manifested no disposition to improve, till a decided tonic plan of treatment was had recourse to.

Soothing applications, of an emollient or sedative nature, will be necessary to relieve the pain and excessive irritation existing in the diseased part. But in the scalp it will often be impossible to derive any benefit from these or any other application, unless the accumulation of scabs is removed. This should be effectually done by soaking them well with soap and water, and afterward removing the hair with a razor. Fomentations and poultices will be necessary after these preliminary steps are taken, if the parts beneath are found inflamed; when ordinary attentions to the general health will effectually remove every remnant of the disease.

Should the vessels continue for a long time to pour out their morbid secretions, a relaxed state of the cutaneous vessels may be reasonably suspected, which it will be necessary to relieve by stimulating applications, such as a solution of nitrate of silver, or of sulphate of copper.

TINEA.

Under the generic name of tinea will be included all the varieties of the disease, known as the different affections of the scalp. The term tinea appears to be more suitable to this affection than porrigo, as the latter applies to other affections also, and the term signifies a spreading abroad of the disease; while tinea, from the import of the word—the destruction of the hair like that produced by *moth*—more clearly points out a disease of the hairy scalp. The various affections of this part, therefore, known under the different names of porrigo, teigne, scalled-head, ringworm of the scalp, will be considered under the above title in as concise a manner as possible.

There is no class of diseases in which so great a confusion of names exists; rendering it almost impossible to identify those described by the French with the descriptions given by English authors, or to ascertain from the appearance of the disease to which class or genus it belongs. Several species have been made of tinea and porrigo, according to the different appearances the disease presents; some evidently, but a different stage of the disease, altering its appearance, also, from the changes and accumulations of the secretions. On this account, and also for the purpose of endeavoring to render the treatment more the result of principles derived from the pathological condition, than to rely entirely on a course nearly altogether empirical, which has been that for the most part adopted in the management of these diseases, the various distinctions will be discarded, agreeably to the recommendation of Mr. Plumbe, who thinks that the varieties have been multiplied to the great confusion and discouragement of the student.

Tinea, in all its forms, appears to be far more prevalent in Europe than in the United States. Although often seen, yet it is comparatively mild, and does not so uniformly present the disgusting characters described by French writers. It is at times a very severe and obstinate affection, and isolated cases, bearing all the appearances described by those who take their descriptions from the instances occurring in Continental Europe, do occasionally occur.

Etiology and Pathology.—These are very obscure. All that is known respecting them is, that tinea appears to originate in the application of infectious matter from others affected with it. It has, however, appeared without any such cause; and as it is evidently local, it appears to arise from some alteration in the action of the capillary vessels of the part. It sometimes is hereditary; and the predisposition unquestionably exists in a deranged digestion. It is at times produced by blows and wounds on the scalp, or by the slightest excoriation.

The seat of tinea appears to be in the reticular tissue of the scalp, but the disease has been found involving the whole of the layers of the scalp, even to the bone. On this account, its seat has by some been fixed in the bulbs of the hair, these being situated beneath the reticular tissue. This is in all probability the case, as the falling off of the hair is a most remarkable symptom. The blood-vessels secreting the hair, may, from extreme excitement, prevent the part secreting the hair from its reception of a proper supply of nourishment. Mr. Plumbe thinks, that in the form of the disease which assumes the distinctly pustular appearance, the presence of the hair becomes an irritating cause, when inflammation already exists in the cutis; for each pustule contains a hair which acts as a foreign body.

Semeiology.—The general symptoms of tinea are, at first, itching, and the appearance of variously sized tumors of different shapes, either pisiform or conical, with ulceration of the scalp. These are followed by the oozing of a purulent fluid, and the formation of scabs of a yellow or whitish color. Sometimes they are of a definite shape, matted with the hair; at other times they are large, and cover the whole head like a cap, adhering very closely, and again, they fall off in small pieces, like bran. From these and other circumstances a number of varieties has been formed; but as the different appearances are rather the result of some accidental circumstances, than any difference in the action of the vessels causing the disease, the number may very advantageously be reduced, and, as suggested by the author above mentioned, the characters taken rather from the actual condition of the diseased part, before any alteration has occurred in the secretion. From this there appears to be actually but two original forms of the affection; the others arising from several circumstances occurring during the course of the disease, and materially altering the appearance of the secretions. One distinct form is the common ringworm of the scalp, and the other is the pustular variety. These, and especially the latter, assume all the appearances which tinea presents during its progress. All these may, from the extension of the disease, and the involving of the different tissues, and the accumulation of the abundant secretions, become very varied in their appearance, and obstinate and unyielding under any course of treatment that may be adopted.

The most common form of tinea is the circumscribed form known as the ringworm of the scalp. The first intimation of its existence is the falling off of the hair, as if destroyed by some insect, which, indeed, it was formerly supposed was the case. The spots have a circular form, of a greater or less regularity, generally scurfy along the margin, at other times exhibiting the appearance of minute vesicles or pustules. At this stage of the disease there does not appear to be any secretion from the diseased part; but when any puriform matter oozes from it, small scabs of a straw color form, which, on being removed, leave the surface beneath considerably excoriated. This latter form exists where the cutis possesses naturally an exalted state of irritability, but the disease in fact is the same. These patches exist in different parts of the scalp at the same time, but different in size and stage. Some in their incipient state, having the appearance of a small yellow colored spot, and others in various sized circles, generally bordered with small achores. When the pustules form, there is a considerable itching, when the disease spreads with great activity, while the drying of the fluid of the pustules produces scabs over every part; these scabs become, from their hard and intractable nature, new sources of irritation, when more extended inflammation of the scalp follows, and purulent secretion, from a more extended source, obscures the original form of the disease.

TREATMENT.—The principle which should be adopted in this form of disease, and such as experience has sanctioned, is either the establishment of an entire new action in the capillary vessels by the application of powerful stimulants, or the destruction of the capillary vessels themselves, on the disordered action of which the disease depends. These are the yellow wash, solution of the nitrate of silver,[*] sulphate of copper,[†] or any of the mineral acids, which may be used in an undiluted state. The latter is the best, for nothing can be relied on that will not at once cause an alteration in the action of the part; a destruction of the part follows the application of these powerfully corrosive applications, and after the separation of the eschar, some slight suppuration follows. The whole of the hair on the diseased part should be removed, and the acid applied for a few minutes; it should then be carefully washed with soap and water. Either of the mineral acids may be used, but the sulphuric and nitric appear to be the most efficacious. This is generally all that is required to remove this form of tinea.

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[*] ℞ Argenti Nitrat., gr. xv.
Aquæ Destill., ℥j. M.

[†] ℞ Cupri. Sulphatis, gr. v.
Solve in
Aq. Destill., ℥v. M.

TINEA FAVOSA.—This is a more diffused and distinct form of the eruption, consisting of small pustules, occurring in patches on different parts of the scalp, attended from the beginning with great itching. The drying of the purulent oozing forms scabs, which are strongly attached to the skin, with a depression in the centre, and has led it to be compared to the lupine seed, formerly used both as food and for emollient applications. The extension of this form is much more rapid than the former, and pustules arise in every part, attended with secretion of a large quantity of purulent matter, which, matting the hair and drying, forms extensive scabs. When these are removed by means of warm water, an erythematous inflammation appears on the cutis, while it is entirely denuded of its cuticle. A variety of accidental circumstances arise to give the disease a difference of appearance, and the term scalled-head has been applied to that state in which the head is covered with accumulated secretions.

The rapid formation of pustules, Mr. Plumbe thinks, may be traced to the influence of the hair on the part; for where the hair has entirely disappeared, the disease does not exist—the irritation of the hair causing the inflammation, for every pustule will, on examination, be found to contain a hair. The inflamed skin is thus kept in a state of constant irritation by the growing hair.

TREATMENT.—Mr. Plumbe's method of treating the pustular variety differs very materially from the method recommended for the preceding form. The first attention, he observes, must be paid to the general health, and such local measures as are the best adapted to subdue irritation, and preserve the parts clean; and by the early removal of the contents of the ruptured pustules, prevent the matting of the hair, and the additional irritation from the hardened condition of the dried scabs.

It is rarely necessary to have recourse to much active measures of a constitutional nature. It is only where the affection is evidently aggravated by some existing derangement of the system, usually of the digestive organs, or by the peculiar irritability of the skin, arising in scrofulous habits, that these are called for, or where the constant local irritation excites febrile action.

The first step in the local management is to remove the encrusted secretions with soap and warm water, and then to pluck out the hairs on every portion of the affected part by means of a forceps, which is very easily done. The hair over every part of the scalp ought to be cut off with a fine scissors, if the disease be extensive. The pus should be daily removed by ablution with soap and water, and stimulating applications made to the pustules. A solution of sulphate of copper answers this purpose the best of any. This process should be daily observed until the diseased action is altered. The pustules will gradually cease to be formed, while the cutis has a red and shining appearance, and soon becomes covered with fine new hair.

The disease is sometimes of remarkable obstinacy, spreading and forming extensive scabs in some parts, while others are affected with successive formations of pustules. It is to this form of the disease that the term scalled-head is applied; and an almost infinite variety of applications has been recommended, some of a stimulating, and others of a sedative nature. One of the best is the unguentum hydrargyri nitrati diluted with an equal quantity of ceratum simplex, for young children. The ointment, also, of sulphuric acid is a highly useful application. Both of these quickly allay the itching, and thus remove a great source of irritation. Ointment of capsicum, mustard, and of other stimulating vegetables, have been successful in some obstinate cases. The annexed formula, also, has been found eminently useful in long and obstinate instances.* Tar ointment, either alone or combined with sulphur, has been a favorite popular remedy, and appears to have succeeded when other means have failed. Lotions of sulphate of zinc, sulphuret of potash, the water obtained from the preparation of carburetted hydrogen, have all been useful in such cases.

Among the remedies which have been used with success is the chloride of lime, in the form of a liniment. The subjoined formula is used by Trusen;† or it may be employed in the more simple one here annexed.‡

The iodide of sulphur, prepared by mixing sixteen grains of sulphur with two drachms of iodine, and slowly heating it over a gentle fire until they are completely fused into one mass, when made into an ointment, in the proportion of ten grains to an ounce

* ℞ Plumbi Carb., ℥j.
Pulv. Litharg., ʒij.
Hydr. Deut. Chlorid., ʒiss.
Axung., ℥iv.
Terebinth. Venet., ℥j. M.

† ℞ Calcis Chlorid., ʒss.
Aq. Rosæ, ℥j.
Ol. Amygd. Dulc., ℥j. M.

The first two ingredients to be rubbed together in a mortar, being gradually mixed, and when clear, the last to be added. Applied by means of a pencil.

‡ ℞ Aquæ Chlorin., ʒj.
Olei Olivar., ℥j. M.

of lard, has been highly recommended as succeeding in some very obstinate cases.* The ointment to be rubbed on night and morning, gradually increasing its strength to a drachm to the ounce.

It is sometimes necessary, where great irritability is combined with extensive inflammation, to employ some anodyne applications. Coculus indicus, made into an ointment, in the proportion of two drachms to an ounce of simple cerate, has been used where these remedies are indicated. A poultice of cicuta is also highly beneficial under such circumstances, as is also a decoction of poppy-heads.

In very old cases, with a great accumulation of desiccated purulent matter, Mr. Plumbe found pressure with adhesive straps, and the application of lead water, a very efficient remedy.

FROM CONSTITUTIONAL DEBILITY.

ECTHYMA—PAPULOUS SCALL.

This disease consists of large pustules, rising from a hard bright red base, and covered with a greenish yellow scab. These pustules may arise in any part of the body, but are rarely seen on the scalp, although not confined to any particular part; yet, when once developed, they are limited to one region. When the pustules are fully formed they bear a great resemblance to small boils. When there is but one eruption developed, it runs its course in a very short time; in other cases it is continually renewed, multiplies and becomes confluent. From these circumstances have arisen the divisions of authors, and particularly that of acute and chronic. There is one species which, from its occurring in infants that are debilitated from bad food, or who have recently recovered from other diseases affecting the skin, such as small-pox, has received the name of ecthyma *infantile*. It is also connected with a chronic affection of the digestive apparatus, and is always attended with lassitude, debility, and great emaciation. Besides the cause already mentioned, the cold and damp of the spring of the year, close and confined habitations, and filthy clothing, frequently develop the disease both in adults and children.

Treatment.—This should mainly consist of hygienic measures; and when the disease is observed to occur in infants at the breast, immediate attention should be directed to the condition of the nurse's milk. A change in the nurse is often all that is necessary in effecting such a change in the constitution of the child as will insure a recovery.

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* Lond. Med. Gaz., Sept., 1837.

PEMPHIGUS.

This affection is known by the existence of an eruption of large yellowish and transparent bullæ. This first appears in the form of circular or oval spots, slightly raised from the surface, at first of a red, and afterward of a dusky hue. A quantity of serum is poured out beneath the cuticle, which raises it in blisters or blebs. Several varieties of this disease have been made, from their mode of appearance, the rapidity of their course, or from the absence or presence of febrile action. The age of the patient, also, imparts some peculiarity in its form, from which a species which is called congenitus, or infantilis, has been made.

It may be either acute or chronic; the former is not uncommon during dentition, but then there is not much fever accompanying it. The latter is attended with great emaciation; and little or no hope can be entertained of recovery, as it occurs in connexion with other affections, and is to be regarded rather in the light of an unfavorable symptom than as a distinct disease. Still, benefit may be derived from the application of stimulating ointments, such as the unguentum acidi nitrosi, where the skin is continually covered with new scabs.

In both forms it will be necessary to pay the closest attention to the quality of the milk, and to change the nurse; and where the child is artificially nourished, it will be of the greatest importance to procure milk of a good quality, for more will depend on this than on any therapeutic measures that can be devised.

When the serum has been discharged from the blebs, either naturally or artificially, which may be done when they are large, the part ought to be carefully guarded from friction by means of lint spread with simple cerate. Willan and Bateman both advise, in addition to a tonic regimen, the application of cinchona, in the form of a lotion, to the skin, and hot baths. Pinel, on the contrary, recommends that all topical applications be withheld, as the disease is but a symptom of other affections.

RUPIA.

Rupia is characterized by an eruption of broad flattish distinct vesicles or bullæ, filled with a serous fluid, which becomes opaque and puriform. Scabs are continually formed, of a brown or black color, with ulcers beneath them, which are seen when the scabs, which are easily rubbed off, are removed. These ulcers, if left to themselves, either heal or are covered with other scabs; this process often occurs several times in succession. When the ulcers are finally healed, the skin remains for a long time a deep red or livid. Rupia appears on the legs and thighs, and sometimes on the loins, but rarely on any other part of the body.

Children of a scrofulous habit of body, and those of a delicate constitution, and the offspring of impoverished parents, are those most liable to the atonic and obstinate ulcers forming the disease under consideration. Rupia escharotica, according to Bateman, is the species which most commonly occurs in infants at the breast, who are badly nourished, and who suffer from protracted sickness.

TREATMENT.—The first object is to improve the general strength of the child by a suitable nourishment, and the free exposure to fresh air. A good nourishing diet, of which animal food forms the principal ingredient, will be required for children that are advanced in age, and a change of nurse for those that are at the breast. In short, all that has already been recommended under the head of scrofula, will be needed for children suffering from this or kindred complaints.

The local treatment ought, in the first instance, to consist of emollients, applied with a soft rag or a piece of lint. When the scabs are separated, and the ulcers appear to be of an indolent nature, some stimulating wash will be needed to excite a proper action in the capillaries of the part, for the formation of a new epidermis; a weak mixture of brandy and water will be found useful for this purpose. Cream of tartar has been used by M. Rayer, by dusting it over the part, and he considers it the best application he has used for the ulcers of rupia. The sulphurous baths have also been used in obstinate cases with much benefit; and where the disease is extensive, the common warm bath is indispensable to cleanse the body from the accumulation of scabs, and to excite a salutary action in the cutaneous vessels.

FROM SPECIFIC CONTAGION.

SCARLATINA.

By some it is believed that scarlet fever is a disease of modern origin, and that it dates its existence comparatively but a short time back. By others it has been thought that a description of it is to be found in the works of the ancient Greek and Roman writers on medicine. The accounts, however, which they give of diseases that have been supposed to describe scarlet fever, are entirely too vague to be relied on for the establishment of the fact of its existence at that early period; yet it can scarcely be supposed that it did not exist, but the probability is, that this affection was confounded with other diseases which bear to it some resemblance.

According to Rayer, Ingrassius was the first who described it with accuracy, in the year 1556, as it existed in Naples in 1550, where it was known under the name of rosalia. It also prevailed in Paris in 1581, and an account of this epidemic is given by Ballonius.* From this time a vast number of treatises has been written on this subject in every part of the world, of which it would be almost in vain to attempt the enumeration.

Notwithstanding the accounts we have in the earlier essays, the identity of the disease with scarlatina of the present day has been doubted; and even the disease so accurately detailed by Sydenham, which prevailed between the years 1660 and 1670, would appear to be a different affection from that more recently described under the same name by Morton, Cotton, and others. The extreme mildness of the symptoms characterized the disease at this period, and would thus render it difficult to identify it with that which, with similar symptoms in general, is at times one of the most formidable and fatal diseases of childhood we have to encounter.

Besides the epidemics above mentioned, which are the earliest accounts of its appearance in Europe, we find records of its ravages, for the first time in North America, in 1735, when it spread extensively over New England and the middle states. It again raged as an epidemic in the year 1784, and spread over the greater portions of the northern states. From that period to the present it has continued to prevail over the continent, varying in intensity in different places, and possessing in each peculiarities in the symptoms, which make the experience acquired in its treatment in one epidemic often inapplicable in another.

It attacks all ages; but so rarely is it found to affect adults, that it may be regarded as a disease peculiar to children. Among them, although often a mild disease, yet frequently it is marked by the violence of its invasion, its intractable nature, and its suddenly fatal termination; and where the epidemic prevails, the introduction of the disease into a family is regarded with dismay, almost without parallel among the peculiar affections of childhood. It becomes, therefore, one of the most interesting diseases to the physician, and one which still needs much investigation as to the nature of its causes, and the morbid changes which they produce in the system, and which so often defy the most powerful efforts for their removal.

ETIOLOGY.—The exciting cause of scarlet fever is a specific miasm or contagion, but with the origin of which we are unacquainted, and probably shall never know whether it is generated within us, or arises from some combinations of the constituents of the atmosphere, whereby it acquires the properties of exciting the morbid actions constituting the disease. It would seem at times to appear sporadically, and to depend on local circumstances, which will give rise to a fever possessing a scarlet eruption, under circumstances of simple exposure, similar to those which produce ordinary inflammatory fevers.

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* Rayer, p. 183.

However originally generated, the disease is unquestionably contagious, being communicable by virus formed in the body. This seems now to be almost generally admitted, and numerous examples exist in the different professional records in illustration of this fact. Instances of its having been communicated from one individual to another I have frequently known; in one of which, four adult females, who successively had the immediate charge of a child that died from the disease in its most violent form, were within four days attacked with inflammation and ulceration of the throat, having all the characteristics of the inflammation of the anginose scarlet fever. These persons alone attended to the child, frequently holding it on the lap; no others in the house were affected with the disease in any form.

There are various circumstances, both of the atmosphere and of the individual, which influence and control the action of the contagious principle; and hence a great diversity occurs in the disease in its epidemic character, and also, as it affects patients, from their different conditions of system.

It prevails mostly in winter, when the weather is changeable, damp and cloudy; and it has been observed to occur with as much frequency about the period of the equinoxes, at which time the atmosphere is usually in the same condition. As a general rule the disease appears to be less virulent where the atmosphere is pure; and, consequently, is more violent and fatal among the poor, whose crowded and ill-ventilated habitations afford a proper nidus for its development and extension. There are not wanting examples where two and three children of those enjoying all the comforts that wealth can give, are simultaneously attacked, and die with the disease in its most malignant form. The nature of the atmospheric changes modifying the severity of scarlet fever, as in other diseases, is unknown; but that it is more virulent and active than most others, is evident from the fact just stated; and although, like the morbific causes of disease in general, the miasma is more severe in its effects in an impure air, yet we see that the advantages of free air and well-ventilated apartments are not sufficient to protect the inmates from the deadly influence of the contagion of scarlet fever. For the same reason that the disease prevails more at those seasons when the atmosphere is loaded with moisture, it is found to exist more along the course of rivers, and in the neighborhood of lakes and ponds, the dampness confining the miasma to the spot, where it becomes more concentrated and virulent. The peculiar effects, also, of a cold and humid air, doubtless has its influence in predisposing the body to disease, by arresting the healthy organic action of the cutaneous system, and causing a corresponding disturbance in other tissues and organs; the healthy equilibrium being once destroyed, the existing epidemic cause of disease has thus an opportunity of exerting its peculiar influence.

All are not equally under the influence of scarlatina; many escape, when exposed to the disease in its most aggravated form. It is said to attack females more than males,* but this is a fact much to be questioned; for if such be in reality the case, it must be more fatal to males than females, for of 158 fatal cases, which occurred in the year 1839, in the city of New York, 86 were males, and 72 females.† Of 391 deaths in 1840, 208 were males.

Although children, at all ages, are liable to be attacked with the disease, yet infants at the breast are not so often affected with it as older children. This has been observed in the hospitals in Europe which are devoted exclusively to children at different periods of life. It is difficult accurately to arrive at the precise fact in this country from public statistics; but if the annual reports of deaths be any criterion, such would appear to be the case.. In the epidemic which prevailed in the city of New York, in 1837, out of 579 deaths, 72 were children under one year, 125 between one and two.

In 1839, the deaths from scarlet fever amounted to 158. Of this number 17 were under the age of one year; 25 were between one and two; 79 between two and five, and 28 between five and ten. In 1840, 334 deaths occurred among children between one and ten years, out of 391. During the period of twenty years, from 1807 to 1827, the deaths from this disease in the city of Philadelphia, amounted to 102. Of these, eight were under the age of one year; 11 between one and two; 37 between two and five, and 17 between five and ten.‡ It would appear, therefore, to prevail less frequently among sucking infants, which has also been remarked by Billard, and by American physicians. Children of the age of three to five years are more often the subjects of this affection than others. Boarding schools, and the hospitals devoted to the reception of children of all ages, often have the disease prevailing as an epidemic, while in the foundling hospitals, which contain children only of a very tender age, it is scarcely ever seen.

Children of a sanguine temperament and robust habit of body, are those most liable to be attacked, and in them the invasion is often very sudden, and quickly fatal. The most violent forms of the disease which I have seen, have occurred in children, who, at the time of their seizure, were in the enjoyment of the most vigorous health, terminating fatally in from twelve to thirty-six hours.

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* Rayer, Op. Cit., p. 173.

† Annual Report of Interments, etc., by William A. Walters, City Inspector.

‡ Emerson's Medical Statistics, American Journal of the Medical Sciences, vol. i. for 1827.

SEMEIOLOGY.—The usual divisions of scarlet fever are taken from the appearances which the disease exhibits, and are regarded the best, both for accurate descriptions and for the general direction of the treatment of the disease in all its forms. The first of these is, where the rash alone exists without any concomitant affection, denominated scarlatina simplex; the second, where inflammation of the fauces attends the eruption, and known as scarlatina anginosa; and third, where the latter affection is attended with ulceration, sloughing, and typhoid symptoms, and distinguished by the title of scarlatina maligna. These different species are described as uniformly existing as such, and consequently easily recognised; but this is not always the case, for during the prevalence of an epidemic, not only are all these forms found simultaneously and in different degrees of virulence, but the mildest often passes into the severer, and that which at first was but a slight affection, and to appearance devoid of danger, may almost imperceptibly become inflammatory with the tonsils and glands, which at the commencement exhibited but the slightest blush, swelling to a great size, and gradually exhibiting extensive ulceration and sloughing, and terminating in the death of the patient, with all the symptoms attending scarlatina maligna. The malignant form, to which the ulceration and sloughing of the throat are an essential part, rarely attacks the patient at the immediate onset of the disease, but is the effect of previous inflammation, varying in its duration, which is often very short.

The disease, in fact, from the lightest to the most serious form, is but one, differing in different cases only according to the violence of the invasion, the extent and number of tissues affected, and the modification it undergoes from the immediate influence of the exciting cause acting with more or less virulence, and also from the previous condition of the individual attacked. However convenient these divisions may be for nosological description, it is of more importance to consider it as one disease, liable even in its mildest form to extend to different tissues, and to alter in its character during its progress. The disease when so regarded, will be more attentively watched; and the violent symptoms, which are at times remarkably gradual in their advance, be much more likely to receive that prompt attention which alone can control this formidable affection.

This naturally leads to the consideration of the different modes of attack, and the actual progress of the disease, for a division of symptoms taken from these circumstances has a direct bearing on the treatment; and the practitioner should be always prepared not only to combat it in its peculiar form at first, but also to be ready to encounter the most severe symptoms which may arise, even after the invasion of the disease in its mildest form.

Scarlet fever, as it has appeared in our late epidemics, has uniformly assumed at its commencement one of three prominent forms: that of inflammation more or less violent, of congestion of the brain, and congestion of the pulmonary system and heart. Scarlatina simplex, or the cutaneous disease alone, without any inflammation of fauces, I have never seen; but there has always been some degree of inflammation of this part, often, indeed very slight, accompanying the cutaneous eruption. As the scarlatina simplex, the disease without anginose affection, has been described by Sydenham, Cullen, Frank, Gardien, and others, it has unquestionably existed, and therefore forms a necessary part of the account of the disease, which will be described as commencing under four different forms. First, the simple. Second, the inflammatory—the inflammation existing not only in the congeries of mucous follicles of the throat, forming the tonsils, but also occupying the trachea, bronchiæ, gastric mucous membrane, and even the cellular tissue. Third, the cerebral congestive form, known by the extreme suddenness of the attack, the loss of almost all muscular power, and the paleness of the surface. Fourth, the pulmonary and cardiac congestion, where a similar loss of muscular power exists, but accompanied with a deep modena hue of the skin, occasionally mottled with purple spots. These are the forms under which the disease appears at first, but, as may be supposed, not in every instance so uniform and distinct as to be unconnected with the other. The congestion may not always be complete, or unaccompanied with symptoms of inflammation, and the congestion of one part being often quickly followed by another: that of the lungs almost always being succeeded by that of the brain. These, however, are sufficiently distinct for a practical description of the disease. The simplest appearance of scarlet fever necessarily comes first under our notice, in which the most perfect form of the eruption appears; it therefore becomes the proper type of the cutaneous affection: the more complicated and virulent being attended with some alteration in the morbid condition of the skin.

In the ordinary scarlet fever, without complication, the first period is characterized by a feeling of debility, with chilliness, alternating with more or less heat. There is also headache, and sometimes nausea and vomiting. All these precursory symptoms are increased toward night. Occasionally, however, the eruption takes place without any of these symptoms.

The eruption usually appears on the second day of the attack, in the form of small spots, at first on the breast, neck, and face; these are of a pink color, with the skin between them of the ordinary hue. These spots increase in number, and cover the rest of the body within twenty-fours. At this period of the disease, I have never seen the tongue and fauces without their marks of the inflammation, although it has been described as destitute of any appearance of inflammatory action. The appearance of the eruption differs on the third day, when the interstices above mentioned change to patches of a light scarlet color, irregular in their form. The efflorescence is not uniform over the body, but is more vivid in the articulations, and about the large folds of the skin. On the trunk the patches are much larger than on the limbs. A roughness, produced by the elevation of the cutaneous papillæ, from the determination of blood to them, occurs on the outer parts of the arms and thighs. When at the height, the eruption is more vivid in the evening and at night than at any other part of the day; it is then of a very bright scarlet, and has been compared to the color of a boiled lobster, or the stain produced by the juice of the raspberry.

On the fifth or sixth day the eruption changes its color to a paler hue, when a desquamation of the cuticle commences, which is at its height on the eighth day.

The tongue is sometimes furred white, with the sides red, at the commencement of the disease; but becomes red, as above mentioned, on the appearance of the eruption.

At the period of the disappearance of the eruption, it is not unusual for a new crop of scarlet spots to arise, of a small size, and fewer in number, which soon disappears, with a free perspiration.

Where the disease assumes an inflammatory form, the above symptoms are combined with a greater or less inflammation of other organs and tissues, besides the external covering of the body. This inflammation can indeed be seen, as I have before observed, in the fauces, even in the slightest degree of the cutaneous eruption, and exhibits in different cases all the phases of inflammation, from the slightest blush, to an enlarged and excessively painful condition of the tonsils and adjacent parts, and its ultimate consequences, the extensive ulcerations and sloughing, so often occurring in the worst forms of this disease. Scarlet fever may, therefore, be considered in all its forms as one disease, differing only in degree, in which the extension of the morbid changes in the different tissues may often be distinctly traced. There is the simplest form in which scarcely any other morbid action can be discovered beyond those already described; and in the same epidemic may also be seen, not only inflammation of the fauces, but also that of the different portions of the alimentary mucous membrane, of the membrane lining the trachea and bronchiæ, of the cerebral meninges, and of the cellular tissue throughout the body. All these may exist, variously combined as to degree, in every severe case of inflammatory scarlet fever; but one or other will be the prominent aspect the disease assumes. The inflammation affecting the fauces being the most common, and usually preceding the others, demands the first attention; it being, however, borne in mind, that the inflammatory form of the invasion, where excess of vital action prevails, is here under consideration, let the seat be where it may; in contradistinction to the congestive form, where a loss of vital energy characterizes the first symptoms of the disease, a difference of great importance in a practical point of view.

This form is ushered in with the ordinary symptoms attending inflammatory fever. At first there is a feeling of chilliness and weakness, with pain in the loins, which are quickly followed by reaction, with the usual symptoms of quick and anxious respiration. The pulse is rapid, often hard and full, and the surface of the body much hotter than in ordinary fevers, sometimes rising even as high as 112° Fahrenheit. Generally there is severe pain in the head; nausea and unquenchable thirst attend the violent invasion of the disease. These are the most strongly-marked symptoms with which the disease commences, and usually precede the eruption two days.

It is not, however, always that the citadel is thus violently invaded; for often a most violent and inflammatory scarlatina will follow symptoms of remarkable mildness. After a slight degree of fever, succeeded by the usual morbid changes in the cutaneous surface, and when hopes begin to be entertained of the speedy recovery of the child, it is by no means an unusual thing to find the inflammation of the tonsils gradually, but steadily increasing; the neck and face becoming enormously swollen, and the disease assuming, almost imperceptibly, characters which give the worst prognosis, contrary to that which may have been entertained, from the mildness of existing symptoms.

When the fever commences violently, the appearance of the rash is about the second or third day; but in this, and in the parts in which it appears, there is not always a uniformity, for it does not always cover the whole body, but is mostly found on the inside of the thighs, and about the elbows and wrists. It will often appear and quickly disappear, and vary much in its intensity. This irregularity is always connected with severe constitutional symptoms. For the most part, the eruption is general over the body and members, while the skin is very hot and arid.

If the febrile symptoms are not early abated, the fauces soon become much inflamed, commencing with a feeling of stiffness, and attended with a difficulty in deglutition. If this part be examined, it will usually be found swelled, with patches or streaks of red occupying indiscriminately the tonsils, uvula, and posterior part of the pharynx. The inflammation increasing, the fauces exhibit a uniform redness, which increases and spreads with the continuance of the constitutional affection. The whole of the soft palate and tonsils present a tense and shining appearance, with lines and patches of inspissated mucus or coagulable lymph deposited on them, adhering closely to the part from which it is secreted; it is the product of the deranged secretory functions of the inflamed glands. This exudation may be mistaken for the beginning of ulceration.

Small vesicular elevations are at times formed on the inflamed mucous surface; these often unite and break, exhibiting in their place red excoriations, which, however, are soon, in favorable cases, covered with a new epidermis. If the inflammation continue violent, not only do the general symptoms increase in severity, but the character of the inflamed tonsils very materially alters. The color becomes darker, and even livid, around the apthous elevations above named. When these break, the parts beneath exhibit a dark, excoriated surface—a true sloughed or gangrenous condition.

These changes are always attended with a corresponding increase of unfavorable symptoms in the circulatory system. The pulse is small, feeble, and irregular, and the breathing short and oppressed. The heat of the surface is irregular, generally much less than when the circulation is in a comparative degree of normal activity. Its equilibrium is destroyed, and congestion takes place in the brain alternately, with short periods of excitement; hence dulness and stupor alternate with great irritability, peevishness, and sometimes with violent delirium. The eyes are blood-shotten and suffused, and the cheeks are more than usually flushed. The mouth and teeth are covered with a brown sordes, and the breath is extremely offensive. Mucus, of a very viscid nature, is secreted about the throat and fauces, producing a difficult and noisy respiration; and when secreted more freely from the surface of the trachea and bronchial tubes, which is commonly the case in young infants, suffocation is often threatened, from the almost complete clogging up of the air-passages. Sudden and violent coughing will at times remove the threatened danger, by filling the fauces and mouth with thick mucus from these passages, which is with difficulty completely removed by the fingers.

These violent symptoms may appear at very indefinite periods, sometimes not until the second or third week, and at other times very shortly after the invasion of the disease. There is no difference in the aspect of the inflammation of the throat at the commencement, be its duration what it may. But when these unfavorble symptoms ensue early, great irregularity takes place, both in the appearance and duration of the eruption, which varies in color and extent, being usually of a dark red or purple hue, and appearing and disappearing in different parts of the body; and the constitutional symptoms, above detailed, exhibiting a more marked evidence of the serious loss of vital energy in the system. Some epidemics of scarlet fever have been characterized by the quickness with which the animal powers are prostrated, and the consequent rapidity of the ulceration and sloughing of the inflamed parts, when a general collapse of the system soon shows itself. At other times, the same characteristic symptoms will appear in some individuals who are exposed to those exciting causes which produce a mild disease in others, arising from some inscrutable peculiarity of constitution.

During the progress of the disease, the nares are often the seat of inflammation, which causes a secretion of thin sanious matter to be poured out in great abundance from the nostrils, of a highly acrid quality, adding greatly to the general distress from its excoriating the lips and cheeks. The gangrenous condition of the throat in scarlet fever differs in no respect from cyanche maligna, except in the presence of the eruption, which is its characteristic, in its more extensive complications, and in the greater tendency to congestion of important and vital organs.

The gastric mucous membrane at times partakes of the inflammation to a greater degree than other membranes, when the same viscid secretion takes place in the stomach. Under these circumstances it is often surprising what enormous doses of medicine are required to produce any effect; and when this organ is lined with the thick and tenacious mucus from these inflamed membranes, it is almost impossible to obtain any operation from the administration of emetic substances. This is generally present during the active stage of the scarlet fever; but, when once formed, continues to be one of the constant symptoms throughout all the stages of the disease.

After a short continuance of these unfavorable symptoms, a general prostration of the system ensues; the difficulty of respiration increases, a copious diarrhœa occurs, numerous petechiæ are formed in different parts of the body, the surface becomes cold, and death takes place in some cases as early as the second or third day, and in others not until the expiration of as many weeks.

In the active stage of the disease, among other parts that participate in the inflammation, is the cellular tissue throughout the body, causing a general swelling, hard and resisting to the touch, wherein it differs from the serous infiltration which produces œdema. This swelling is particularly noted about the face, hands, and other flexures of the limbs. When the disease has a tendency to terminate favorably, the febrile symptoms abate about the fifth day, when the eruption of the skin and the inflammation of the fauces also lessen in their violence; the cuticle beginning to separate about two or three days after, attended with great itching and increased sensibility. These symptoms, with the presence of a lateritious sediment in the urine, may be regarded as almost certain evidences of convalescence.

It has frequently been noticed that a short inflammatory excitement will follow the separation of the cuticle, and be succeeded by a new desquamation; the excitement is but temporary, and can in no instance be regarded as of sufficient severity to require any treatment. The bowels which, during the active stage of the disease, are costive, become relaxed in convalescence, and a spontaneous diarrhœa will frequently arise on the abatement of the fever.

The next form of attack which is the most frequent, is that in which the brain is the seat of congestion. This is extremely sudden and rapidly fatal; making its appearance without any premonition whatever, and often terminating without any evidence of the return of arterial action. The first symptom is that of overpowering cerebral congestion, bearing a resemblance to the sudden effusion in the brain, described by Dr. Gòlis under the name of water stroke. The cause of this condition of the system is always to be strongly suspected in the absence of all pathognomonic signs, when scarlet fever prevails; and during an epidemic the practitioner will rarely be in error, when he refers it to the influence of the contagious principle of the disease, at once overpowering the vital energies. On other occasions a short period of exhilaration will precede this loss of nervous power, characterizing the state of congestion. The child will appear to be more than ordinarily excited in spirits, participating in its sports with a joyousness so unusual as to attract attention, but without any manifestation of diseased excitement. Perhaps after a short time, sleep will overpower him, from which he is with difficulty aroused. When placed upon the feet he will be observed to stagger; while a universal inability to move the limbs, and an expression of stupidity and indifference to all around him, first excite the alarm of the parents.

When this congested state exists, the surface of the body and face is pale and cold, while the lips are swollen and livid. The head is hotter than any other part; the eye-lids are half closed, and, when opened, exhibit a dull expression of the eyes. As the disease advances the pupils become dilated, a condition which often arises early in this disease. It is not always an evidence of effusion.

A great degree of pressure on the brain, from whatever cause, will produce the same symptom.

It sometimes occurs that the cerebral congestive form is much slower in its approach, and the patient may be languid and pale for some days, all the movements being slow, and with appearance of fatigue. The pulse is slow, irregular, and oppressed. The tongue is white, and the salivary glands secrete a thickened saliva. In this state there is a very evident derangement in the secretions of the chylopoetic viscera, as appears from the flatulent and distended condition of the abdomen, and the altered appearance of the alvine evacuations, which, for the most part, are much darker than ordinary. There also exist a great loathing of food, and an irritable state of the stomach. The eruption on the surface is of a dark red or purple color, more in the form of patches, than in the ordinary efflorescent appearance characterizing the morbid alterations in the skin. In the sudden congestive form, often no eruption appears until after death.

When this form attacks suddenly, in the manner first described, it is not unfrequently fatal within the first twenty-four hours; when it is slower in its invasion it will terminate fatally in from two to five days. The throat is rarely affected when the attack is sudden, but if the child should survive the third day, small sloughs are found in the fauces, but without much traces of inflammation.

There is another form in which scarlet fever makes its attack; where the lungs and heart appear to be loaded with venous blood, and the blood vessels are greatly impeded in their action. In no instance does it attack the child with the violence of the form just described, nor is it by any means regular in its commencement and progress. It often commences with the usual feeling of chilliness, alternating with heat, weariness, and headache. The development, either of the fever or eruption, is not uniform. In general, however, on the second or third day, the body and limbs will be covered with a dark red efflorescence, in some parts inclining to a purple. The surface will be intensely hot to the touch, while the patient, if old enough, will complain of a sensation of chilliness. The throat early shows the existence of inflammation, and is considerably swollen. Respiration soon becomes labored, the pulse slow, small, and irregular. The condition of the cutaneous surface, the state of the circulation, and the labored and oppressed respiration, clearly indicate the loaded condition of the great vessels at the centre of circulation. If blood be taken from the arm, or if leeches be applied to the throat, the color of the surface rapidly undergoes a change from the dark red to a livid paleness, even though a small quantity of blood be lost; the pulse becomes smaller, and if the heart does not possess power to produce an active circulation, either from its own inherent force, or with the assistance of such judicious means as art may afford, a fatal debility ensues. This form of congestion rarely, if ever, exists, without being followed by that of the brain, sometimes in the short space of twenty-four hours after the full development of the disease. The face becomes swollen and pale, with livid spots where the eruption was the thickest, and an irremediable comatose condition indicates the course of the disease.

The latter form assumes every grade of the congesto-inflammatory condition, wherein the anginose affection, with which the disease commences, is associated with inflammation of the bronchial tubes. When this is uninterrupted in its progress, the pulmonary system becomes more or less engorged, and sometimes very rapidly suffers a complete congestion; this state of the venous system being present in a partial degree from the commencement, and increasing with the increase of the inflammatory symptoms.

The loss of vital energy, constituting congestion, is not always found in the debilitated and delicate, for I have seen it attack the most robust, and prostrate the child in thirty-six hours. It often appears to depend on the impure air the child breathes, and more particularly in confined and damp apartments, excessively heated. Under these circumstances the worst cases of pulmonary congestion, combined with inflammatory action, have occurred; and when not quickly fatal, the usual symptoms of extreme prostration arise: the tongue is dry, the teeth covered with sordes, the inflammation of the throat becomes livid, extensive sloughs form, and the disease assumes the form usually denominated scarlatina maligna.

With this irregular condition of the system, an irregularity also exists with regard to the eruption. It is not uniform in its appearance, and is much less diffused than either in the simple inflammatory form, or in the true congestive variety, as it occurs in the pulmonary system. It is also very liable to disappear after it has once made its appearance, leaving the skin pale and livid.

This form of scarlet fever, when it terminates favorably, is remarkably slow in its convalescence; for the tendency to collapse, and the irregularity of reaction, present a continued succession of morbid actions to be encountered by the physician, for the removal of which his art is too often powerless; and to unresisted nature, after a long period, marked by anomalous symptoms almost without parallel, he is often compelled to leave it, with the simple adoption of the ordinary rules of hygiene.

Besides these varieties of the disease, there has existed a pustular form, in which the ordinary eruption was complicated with pustules. An epidemic of this kind prevailed in France in 1777, an account of which is given by Lorry, and was extremely fatal. After the usual premonitory fever, accompanied with congestion of the brain and delirium, red spots appeared on the hands, arms, loins, and face. With them the disease increased in severity, the body became much swollen, and bore a resemblance to tanned leather. The patients died with all the symptoms of malignant disease, and with the body covered with pustules.* Miliary eruption has also been complicated with the efflorescence of scarlet fever in some cases, although some have been fatal; yet an abatement of the symptoms generally followed the appearance of the eruption.† Withering and Rush describe similar symptoms.

Other varieties have been its complication with great derangement of the digestive system, and the presence of a large number of intestinal worms which were discharged both by the mouth and anus. An epidemic of this nature prevailed in the city of Cefalonga, in 1763.‡ In other instances, violent pain was the most marked symptom, as in the epidemic in Copenhagen, in 1777 and 1778, of which Meza has given an account. Morton has given the history of the disease, as attended with buboes; while other epidemics have been characterized by ulceration of the throat and genital organs, accompanied with miliary eruption, derangements of the biliary secretion, or, as above mentioned, with great numbers of worms. These are not isolated cases, but the character of prevailing epidemics, which arise from the action of the same unknown causes that first produce the disease.

The secondary effects of scarlet fever are dropsical effusions, rheumatic affections of the joints, with contraction of the tendons, and suppuration of the external glands of the neck, and purulent discharges from the ear.

DROPSY.—The dropsy following scarlet fever is often more serious than the original disease; for it is observed to follow the mild form, and never what is denominated the malignant. It is at times a formidable affection, demanding more of the attention of the physician than the disease which precedes it; for a fatal progress may imperceptibly be made, when danger is little suspected, and even when, from the extreme lightness of the primary affection, a speedy recovery is expected. Every physician is familiar with the slowness of what is termed convalescence in scarlet fever, but which, from the number of obstinate symptoms, and their occasionally fatal termination, might better entitle it to the name of a distinct stage.

Dropsical effusion appears in some instances suddenly, at any period from the time of the disappearance of the eruption to the end of the third week. In the greatest number of instances, however, after the pathognomonic symptoms have disappeared, the swelling gradually shows itself, preceded and attended with lassitude, fretfulness, and slight febrile excitement. At night the little patient is extremely restless and feverish. These symptoms will continue for several days, without any mitigation or change of any kind, and without the usual symptoms of local disease; but a general feeling of uneasiness appears to pervade the system. The face and lower extremities first give evidence of the existence of serous effusion in the cellular membrane, which is gradually filled in every part of the body. Effusion, also, occurs in the large cavities; and ascites and hydrothorax, in severe cases, accompany the other species of dropsy, and usually precede a fatal termination of the disease.

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* Hist de la Soc. Roy. de Méd.

† Institutions of the Practice of Medicine, by John Baptist Burserius. Translated from the Latin, by Brown; Edinb., 1801, vol. ii., p. 203.

‡ Burserius, Op. Cit.

When anasarca is unattended with febrile excitement, there is but little danger to be apprehended, although the serous fluid may be extensively diffused. When, however, there exist much heat of skin, thirst, restlessness, and general uneasiness, it demands early and prompt attention; for these symptoms will not long continue without being followed by local inflammation, congestion, or effusion, in important parts, often terminating fatally. If possible, these should be anticipated; for when once they are established, there is great difficulty in their removal, complicated, as they are, with a general affection which embarrasses the action of the whole circulation. It rarely happens that this febrile action continues even for a short time, without tenderness of the abdomen, vomiting, interrupted respiration, or a dry cough following; and the patient either sinks under the accession of a violent inflammation, or from the effects of excessive effusion, in some of the important cavities.

The urine, in cases of dropsy following scarlet fever, exhibits, by its coagulation by heat, the presence of albumen. Its specific gravity is much less than usual, and its color differs materially from the straw color which is the characteristic of healthy urine. It bears a greater resemblance to serum or whey, and is occasionally of a reddish hue, and small in quantity.

RHEUMATIC AFFECTIONS OF THE JOINTS, WITH CONTRACTIONS OF THE TENDONS.—These are by no means so common as the sequela above mentioned. On the disappearance of the eruption a pain in the wrist, hand, or knee, will be felt, attended with a slight inflammatory blush. Occasionally the pain is very severe, and will not admit of the extension of the affected member. These rheumatic affections are most likely to occur where there is an hereditary tendency to the disease.

In some cases the rheumatic inflammation will terminate in contraction of the tendons, of long duration and obstinacy, causing considerable deformity; and if occurring in the tendons about the knee, renders the child unable to walk without the assistance of a crutch.

SUPPURATION OF THE EXTERNAL GLANDS OF THE NECK, AND PURULENT DISCHARGES FROM WITHIN THE EAR.—These are of frequent occurrence in children of a scrofulous habit. The former commences with the usual signs of inflammation on the subsidence of the febrile affection, and is very obstinate and long continued, like other sequelæ of this disease.

The purulent discharge from the ear is, in most instances, preceded by a partial loss of hearing during a continuance of the eruption. Whenever the throat is much inflamed, the inflammation is liable to extend through the Eustachian tube. In a few days after the violence of the symptoms have disappeared, a slight discharge of purulent matter from one or both ears will show itself. It is often followed by a permanent deafness more or less severe, from a thickening of the membrane lining the Eustachian tube, and a partial closure of this passage.

MORBID ANATOMY AND PATHOLOGY.—In most cases of this disease that have been subjected to post-mortem examination, the capillary vessels of the mucous coat are found injected or ulcerated. These are more often found about the pharynx and fauces than in any other part of the alimentary track. The injection often appears in the form of streaks of a crimson color, varying to a brown or livid hue; the latter being more intense in and about the tonsils and soft palate, which are more frequently found in a sloughing state than any other diseased part.

This inflammation is also found in the greatest number of instances to occupy the air-passages; and even extensive ulceration has been discovered in the trachea, with almost an entire destruction of the larynx by the ulcerative process, and this without much disorder of the system other than attends croup, the peculiar symptoms of scarlet fever having disappeared.

In other instances but little traces of inflammation have been found after death, although excessive secretion of mucus has occurred during life; no other morbid appearances existing, besides the presence of this morbid secretion filling the trachea and bronchiæ, together with slight effusion of serosity in the air-cells. Besides this, it is not unusual to find the air-passages filled with a muco-purulent matter, with marks of inflammation about the lungs and pleura. These parts are also at times, especially when the disease has been protracted, in a thickened condition with deposites of coagulable lymph.

In some, the brain is also more or less extensively diseased. The vessels, especially of the membranes, are injected, and effusions of turbid lymph are seen between the arachnoid and pia-mater, and serosity in the ventricles. This is more uniformly found to be the case where the disease has been attended with a sanious discharge from the nose, and with the collection of sordes around the teeth.

In congestive cases, there are little marks of capillary injection, but the larger vessels are loaded with blood, especially the lungs, liver, and brain, which are distended with dark venous blood; and in almost every case of congestive scarlet fever no other lesion can be discovered.

A great difference, therefore, is observed in cases of this disease, according to the different forms it assumes. In the strictly inflammatory form, there are the usual evidences of inflammation in the mucous tissues; such as redness, thickening, ulceration, effusion of muco-purulent matter, and sloughing of the diseased parts. In those characterized by congestion and sudden death, no such lesions exist; but evidences of an entire arrest of the circulatory process are seen in the loaded condition of the vessels at the fountain of circulation, and in the dark color of their contents. In such as partake of the nature of both, a great variety in the appearance of the various tissues and cavities is found, when probably there is no disease presenting so extensive morbid conditions.

It has been also supposed that a change has occurred in the fluids, from the influence of the miasma on the blood, whereby an alteration is wrought in its constituents, and rendering the serum incapable of holding the albumen in solution, which causes the exudation on the inflamed surfaces. Some changes appear to be made in the blood; for in one severe case, where the disease manifested itself in a sudden congestion of the heart and pulmonary system, a small quantity of blood which I took from the arm had more the consistence of dark paint than of blood which usually flows from a vein. Its coagulation also was imperfect. This child died in less than twenty-four hours; cerebral congestion very quickly following the primary attack.

It has also been said that the secretions become acid in scarlet fever. Of the truth of this I am unable to speak from experience. I have often, however, tested the serum of the blood with litmus paper, without discovering the presence of any acid.

As to the morbid condition of the dropsy following scarlet fever, it is unquestionably inflammatory; exudations of lymph having been found on the peritoneum, covering the liver, and in other parts of the body. This view of the nature of the dropsical swellings occurring after scarlet fever, was noticed long since, for Burserius remarks,* that in the epidemic, about the year 1717, in Florence, after the mild form of the disease, which required no other treatment than Sydenham's mild method, a universal swelling occurred, attended with a slight pain in the chest, tormina of the abdomen, and suppression of urine. "These patients, having been previously treated with diuretics, were speedily carried off. After this, the dead bodies being opened, it was found that the lungs, pleura, intercostal muscles, diaphragm, kidneys, and intestines, were more or less inflamed." This is a remarkable corroboration of the facts elicited at different times by autopsical examinations; inasmuch as it clearly and distinctly points out the condition of the parts examined, at a period when anatomical investigations for ascertaining pathological changes were by no means frequent, or remarkable for their accuracy.

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* Op. Cit., p. 433.

Dr. Bright discovered in the kidneys of those who died of dropsy, with albuminous urine, which occurred after scarlet fever, an irregular congestion, without any apparent lesion of structure; but in some cases where a foundation had been previously laid, the more usual appearances of advanced structural derangement were ascertained. In one case which he reports, the kidneys were of a natural size, the tunics adherent, and the cortical portion much mottled, with a white deposite. Congestion, especially in the tubular portion, was the most marked symptom.*

On the subject of the pathology of the disease there exists no little obscurity, and consequently a difference of views—some maintaining that it is an essential fever, with a rash and inflammation of the mucous surfaces arising as a consequence or an effect of this excitement; others that it is originally a morbid state of the gastric mucous membrane, which is previously affected with inflammation, and which is extended to other mucous membranes in proportion to the intensity of the primitive disease.

The latter view appears more in accordance with the facts as they usually occur; but it is not always that the morbid phenomena are previously manifested in the gastric mucous membrane, for the pharyngeal and œsophageal portions of the alimentary canal are those which first give evidence of the disease, in many instances, without any of the usual marks of gastric inflammation. In other instances a tenderness of the epigastrium on pressure, and the functional disturbance of the stomach, show the existence of inflammation in its mucous coat. In by far the greatest number of cases, the first appearance of the inflammation arises in the fauces; the tonsils are red, even where the tongue and other parts of the mouth are but slightly, if at all, inflamed; but where the former are enlarged, and deglutition difficult, the tongue and buccal membrane are proportionably inflamed. From the well-known sympathy which exists between the mucous surfaces, the disease soon rapidly spreads throughout the membranes lining the various surfaces, and to the cutaneous covering of the body, which is but a continuation of the former.

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* Dr. Bright's Cases of Renal Diseases, cited in Johnson's Med. Chir. Review for July, 1840.

An erythematic inflammation, or an overloaded state of the capillaries of the mucous membrane and outer surface of the cutaneous chorion, is the character of the morbid phenomena of ordinary scarlet fever, of different degrees of severity, occurring on the reaction arising after the first impression of the sedative effects of the infectious principle on which the disease depends. The simple form is the mildest variety of erythematic inflammation, and often exists with scarcely any febrile action, and with very little disease of the mucous chorion. In the more violent forms there is much greater disturbance of the vital functions; and when a great determination of blood occurs to the surface, it sometimes happens that effusions of coagulable lymph take place in the papulous elevations, bearing a great resemblance to the eruption of varicella. Dr. Rush* has described this variety of the eruptions, besides the older writers already mentioned.

The congestive form is evidently from the sudden and powerfully depressing influence of the morbific cause, depriving the organs of their vital force, and thus causing a congestion of the larger vessels. This is always the first impression miasmata of any kind make upon the system, as is evident from the debility and lassitude so common on the first invasion of disease from these causes. If reaction, either partial or complete, do not take place, a congestion ensues, producing the most violent forms of scarlet fever, which are, for the most part, speedily fatal. The German physicians consider this condition as produced by a species of narcotism, and as distinct from the congestion of Armstrong. But the two ideas may be easily reconciled, by regarding the poisoning influence of the contagion as depriving the heart and blood-vessels of a portion of their vitality, and producing thereby a congestion, from their inability to act when thus depressed in their vital energy.

TREATMENT.—The simplest form of disease scarcely requires any remedy, and is so entirely free from danger, that, according to Sydenham, it only becomes dangerous from the officiousness of the medical attendant. It is often so mild as scarcely to attract the attention of the parents, and the child is suffered to pass through it without any medicine whatever. It is, however, precisely such cases that are the most frequently followed by dropsy, and therefore it should be our duty to prescribe something that will tend, at least, to preserve a free secretion from the mucous glands of the intestines and the annexed viscera. Suitable aperient medicine should therefore be given, especially when the eruption is at its height, and on its decline; and the danger of subsequent serous effusion, which, as is seen above, is uniformly dependant on a phlogosed state of the serous membrane, will be greatly lessened, if not entirely removed. A simple dose of castor oil, or the eccoprotic mixture, repeated after an interval of three or four days, will be sufficient to produce the effects. The subject of the management of dropsy will necessarily come under the proper head; for the present, it is only alluded to in speaking of the treatment necessary in the mildest form of the disease, which so generally precedes the dropsical effusions.

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* Med. Inq., p. 123.

Besides the employment of aperients, a cooling course of regimen will be the most proper; and should the heat of the surface be very high, tepid or cold sponging will be the most proper measures for lessening the morbid action of the cutaneous vessels. It is in such cases that the cold effusions are beneficial; they are scarcely applicable to cases where there exists much inflammatory action. It is the duty of the physician, however mild the attack may be, to bear in mind the possibility of the appearance of inflammatory symptoms, and to be prepared to meet them; for it is a disease remarkably varying in its character, and although in many instances needing but little treatment, yet in others a steady, but slow aggravation of symptoms takes place, ultimately demanding the closest attention, and the exercise of the greatest discriminating judgment in its treatment.

The inflammatory form of the attack, which will necessarily include that change of symptoms just mentioned, next demands our attention. Upon the proper management of this will depend the removal of those serious organic lesions so often occurring in protracted cases of this disease.

Among the most prominent remedies for the relief of the inflammatory symptoms, is blood-letting; a remedy which has been lauded as the only one which can be relied on for the removal of violent attacks of scarlet fever, and which has also, even in the same epidemic, been condemned as of great hazard, from its inducing a state of debility which so often characterizes long-continued cases of this disease. When judiciously used, especially with respect to the proper time for employing it, it is often a very efficient remedy; but when this proper time has passed over, or where the symptoms, although of an inflammatory nature, do not positively indicate its use, it may in the former case, indeed, fail of affording the desired relief, and in the latter, be advantageously superseded by other means. It is of the most vital importance that the primary stage, or period of active inflammation, wherever this inflammation is located, be selected, as affording the proper proof of the efficacy of venesection; for if it be left until local congestion or disorganization has taken place, although in the one case some alleviation may occur, yet in the other an aggravation of the symptoms will almost invariably ensue. Dr. Armstrong has found bleeding an indispensable agent in the treatment of this disease at the commencement, preventing thereby the consecutive effects which are the cause of death. Numerous instances of the beneficial effects of bleeding, are recorded in the different medical journals in our country.

Dr. McIntosh, in his valuable work,* says: "I saw many fatal cases of scarlet fever when I practised according to the opinion of the schools, carefully abstaining from blood-letting, and using all the means recommended to support the strength." The accomplished American editor, Dr. Morton, sustains him in his views as to the advantages of blood-letting.

The opposite opinion has been maintained by others; and among these, Evanson and Maunsell appear to disapprove of its use, but qualify their disapprobation by remarking, that it can only be employed as a resource, in cases where there is a decided local inflammation, and then only barely sufficient for its control. This, however, seems to be an admission of the benefits derived from the use of this remedy. In our country it is said also to have been attended with the most fatal effects, as was the case in the epidemic which prevailed in Virginia, in 1832.† It is well known that others have held similar views, and from non-success in the depleting plan, have had recourse to an ultra-tonic system. In our recent epidemics, the mild, stimulating course, was in many instances attended with success.‡

All these show that the exercise of a sound judgment is necessary, and that for want of a sufficient discrimination, bleeding has been too general. There will never be any difficulty in obtaining blood in sufficient quantities from the leech bites, in consequence of the highly-injected state of the vessels of the skin. The use of leeches may frequently be resorted to, according to the circumstances of the case, during the course of scarlet fever; and, indeed, there is scarcely a remedy more appropriate than capillary bleeding, where all the symptoms evince so complete a sanguinary injection of the capillary system. It is sometimes needed to unload the bowels; but the employment of active purgatives may be counter-indicated by the phlogosed condition of the mucous membrane, from accumulation or congestion in its capillary vessels. Under these circumstances, therefore, the relief by leeching is often well marked, and this course very properly prepares the body for the use of other and more direct measures.

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* Principles and Practice of Physic, vol. i., p. 189.

† Dr. Magill, in Amer. Journ. Med. Science, vol. xxiv., p. 342.

‡ See Dr. Cornell's Account of Ninety Cases, which were treated by him; N. Y. Journ. of Med. and Surg., for January, 1841.

One of the most powerful means of treating scarlet fever, is the early administration of an emetic, if the tenderness of the epigastrium do not forbid its use; and where the disease spends its force more on the pulmonary system than on any other part, the benefits are immediate, and often permanent; a powerful revulsion being made on the cutaneous surface, and the air-passages being also relieved of their accumulation of mucus, the strong tendency to internal congestions, which exists in this disease, is removed.

Emetics have been restricted to the commencement of scarlet fever by some practitioners; but by such a course we deprive ourselves of a most powerful means of relieving at least one very distressing symptom, the accumulation of viscid and tenacious mucus, which often threatens a child with suffocation. Emetics should, with judgment, form a part of the treatment in a majority of the cases of scarlet fever: in those cases where there is no congestion of the head, nor any gastro-enteritis present. In the inflammatory scarlet fever, after sanguineous depletion, either generally or locally, the employment of an emetic will very materially tend to allay local inflammation, by equalizing the circulation, and opening the cutaneous secretory vessels, and especially does it relieve the inflammation of the tonsils and fauces by causing a free secretion from these surfaces.

It is on this account that emetics, at the commencement of the anginose variety of scarlet fever, are so universally employed. Writers of almost every period, and in every country, bear testimony to the good effects of emetics. In slight affections of the fauces, they will completely arrest the morbid action, without the intervention of bleeding in any form. Emetics, in long-continued cases, it has been observed by a practical author, are the best gargles for cleansing the throat and fauces, and removing the morbid secretions in the ulcerated and sloughed condition of these parts. In this stage, also, they are useful, by cleansing the stomach from the sordes and other morbid secretions, and thus preventing the prostrating diarrhœa, which is of so frequent occurrence at a late period of the disease.

Where there is much inflammatory action, tartar emetic and ipecacuanha may advantageously be combined, especially at the commencement of the disease,[*] and also with squills where there is much bronchial affection.[*] Where there is much prostration, or, in advanced stages of the disease, where the debilitating effects of an emetic are to be apprehended, ipecacuanha may be combined with sulphate of zinc, in the proportion of a quarter to half a grain of the latter, to three or four grains of the former, every ten or fifteen minutes, to a child a year old. But in the use of emetics in this disease, it is almost impossible to designate with any accuracy the quantity which will be required; the coating of the stomach, from the viscid secretions, rendering it difficult in some instances to procure any effcct from medicine given in the usual quantities. I have known more than double the ordinary dose for an adult to be given to a child of five years of age, and repeated frequently, without producing any effect. Dr. Rush prescribed emetics combined with calomel.

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[*] ℞ Pulv. Ipecac., ℈j.
Vin. Antim., ʒj.
Aquæ Destill., ℥ss.
Syrup., ℥ss. M.
A teaspoonful every ten minutes, to a child two or three years of age.

There scarcely exists any necessity for the active purging so freely resorted to some few years since, when it was considered a necessary part of the treatment. It may, however, be active in proportion to the violence of the inflammatory symptoms, if the gastric inflammation do not forbid its employment. Where it is necessary to relieve the bowels, the subjoined formula will be eligible,[†] particularly if there be any tendency to congestion; or castor oil, an infusion of senna, sulphate of magnesia, or manna, and super-tartrate of potash may be used, for effecting the same object. Throughout the disease the bowels must be kept soluble by any eccoprotic mixture, or by an enema.

Among the depletory measures, when there exists much debility, is the action of diuretics recommended by Withering; sub-carbonate of potash was used by him for this purpose with much advantage.

An antiphlogistic course, early adopted and efficiently used, will in this, the most common form of scarlet fever, prevent the disease from assuming the typhoid symptoms, and the disorganization of structure so much dreaded. The adoption, however, of the depleting system requires the exercise of much prudence, that it be well timed and regulated according to the age, constitution and habits of the patient, and also with reference to the nature of the prevailing epidemic. This influence produces its effects by modifying the disease, from the simple inflammatory type, to a state of congestion, more or less complete, whereby it exhibits all the different phases of congesto-inflammatory form. Under these circumstances, great caution is necessary; for in proportion to the existence of congestion, should we be careful in the sudden abstraction of blood, for although the relief of the blood-vessels is necessary, yet this congestion is an evidence of the loss of vital energy, which will not admit of sudden or great loss of blood.

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[*] ℞ Pulv. Ipecac., ℈j.
Antim. Tart., gr. j.
Oxymel. Scillæ.
Syrup. Simpl., āā. ℥ss.
Aquæ, ℥j. M.
A dessert-spoonful every quarter of an hour, for children five or six years of age.

[†] ℞ Pulv. Rhei,
Sodæ Sup. Carb., āā. gr. xv.
Pulv. Ipecac., gr. j. M.
Divid. in Pulv., No. vi.
One powder to be given every two hours, until it affects the bowels.

The ordinary diaphoretic treatment usually adopted in febrile affections is of little avail in this disease, from the continual high temperature of the surface. Antimony, however, has been used, in cases of high excitement, with benefit.

With respect to the local treatment of the inflamed tonsils, it must be directed according to the existing condition of the part. When the inflammation is high, the application of leeches, as already spoken of, is indispensable. Blisters have been recommended, but they should never be applied, from their great tendency to become gangrenous. Poultices are useful applications at every period of the inflammation.

When ulceration and sloughs appear in the throat, stimulating gargles will become necessary, made with infusion of sage, tincture of myrrh, and decoction of bark; or, where the sloughs are separated with difficulty, they may be touched with something more stimulating, as burnt alum, or nitrate of silver.

In general, the local management of the diseased tonsils differs in no respect from that already given when treating of cynanche maligna, to which this disease bears so close a resemblance in one stage, as to have been regarded as the same affection.

As was before remarked, the abstraction of vital power is sometimes, from the peculiar action of the epidemic influcnce, very sudden, and collapse very quickly ensues after an attack. In such cases but little if any inflammatory action occurs; but where there is much inflammatory development, the stage of sinking and collapse is much slower in its approach, and is not likely to be extreme where suitable antiphlogistic measures have been pursued at the commencement. Whenever it takes place, it will be necessary to resort to mild stimulants to arouse the circulation to its wonted vigor.

One of the best and most natural stimulants is the influence of pure air. The room of the patient should, therefore, be carefully ventilated, and everything that can in any way render it impure must be removed. Wine whey should be cautiously used, and its effects watched. Infusion of serpentaria is very valuable, from its tendency to excite diaphoresis, while it exerts a stimulating effect upon the heart. When the collapse is excessive, with a feeble action of the capillary system, the administration of camphor will be found highly useful. When, therefore, there is a great prostration of the vital powers, manifested by a weak and tremulous pulse and a cold surface, it will be found advantageous, especially when combined with musk, from its qualities of increasing the activity of the nervous energy. It may be given to an infant in the dose of one half of a grain, and from one half to one grain to children from two to four years of age. One of the best forms of its administration is the mistura camphoræ of the dispensatories, or the camphor julep. Another mode of giving it is by rubbing it up with milk, which completely suspends it, and thus renders it easy to swallow; or it may be given suspended in mucilage.[*] In these cases, and where there is a recession of the eruption from any cause, it is useful as an external stimulant, applied by rubbing the surface briskly with a piece of flannel, moistened with a saturated solution made with alcohol. Stimulating frictions of the tincture of capsicum or brandy, care being taken that it be kept hot, and that the skin be not cooled by its evaporation, will also be useful in cases of collapse.

Where a prompt and vigorous excitement is needed, the sesquicarbonate of ammonia may be employed; it is a powerful stimulant, and more especially applicable to those cases characterized by a great diminution of sensibility and a small and scarcely perceptible pulse. Dr. Peat recommends it in scarlatina maligna almost as a specific, in large doses. It is, indeed, a valuable medicine where the disease is marked by unequivocal symptoms of debility, with sloughing of the throat and tonsils. It should be given in a solution, in the form of an emulsion with mucilage, in the dose of two to four grains to children from four to seven years of age.[†]

The form of attack known as the sudden congestive invasion of the brain, is almost invariably fatal; whatever is prescribed appears to be of little effect, for effusion and death soon occur. In those, however, which have been preceded for some days by languor, a foul tongue and a costive habit of body, although the attack of cerebral disease may appear to be sudden, yet there is some prospect of relief, if the appropriate means be promptly and judiciously used. Although the abstraction of blood may be necessary for the relief of the congested vessels, yet it ought to be carefully done, and the condition of the patient closely watched, and other measures combined, until sufficient reaction be restored to the arteries to warrant a more decided and free loss of blood.

When the physician is called to this form of scarlet fever, it becomes his duty to remain with the patient, that he may be ready to avail himself of the proper periods of action; and there is no disease where there exists a greater necessity for the exercise of a sound judgment. The entire reliance on one course of treatment is probably the great cause of failure; whether that course be the local or general abstraction of blood, or the use of stimulants and tonics. Under no circumstances of the congestive form can any general course be prescribed, and the patient left at the commencement of the attack; but a close watching of the symptoms becomes necessary, and the treatment regulated according to the existing circumstances.

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[*] ℞ Camphor., gr. iv.
Mist. Acaciæ,
Syrup., āā. ℥ss.
Misce et adde,
Aquæ Flor. Aurantii, ℥j. M.
A teaspoonful every two hours.

[†] ℞ Ammoniæ Sesqui-Carb., gr. viij.
Mist. Acaciæ,
Syrupi, āā. ʒss.
Aquæ Anisi, ʒiij. M.
A teaspoonful every hour.

The objects to be attained are the unloading of the congested vessels, and the restoration of the action of the heart; and it requires some judgment accurately to decide whether we are first to resort to bleeding, either locally or generally, or endeavor in the first place to excite some action and revulsion on a remote part, before resorting to a remedy which, while it unloads the vessels, will at the same time lessen the vital forces.

The safest course is, probably, to immerse the lower extremities in a stimulating bath of Cayenne pepper, to envelop the body in flannels wrung out in hot salt and water, and to apply a sinapism on the epigastrium, giving, at the same time, a full dose of calomel. That no time be lost, a stimulating enema of a solution of salt, or an infusion of senna, will not only have the effect of producing a revulsion on the intestines, but will also act in some degree as a stimulant to the system, and relieve the loaded vessels. After a sufficient time has elapsed, the operation of the calomel may be promoted by the use of castor oil, or an infusion of senna and manna and salts, the action of which will greatly relieve the congestive tendency, especially when it has been ascertained that there has for some days previously existed a general torpor of the chylopoetic viscera. It is only to produce this decided effect that calomel is admissible at the commencement of the disease. A continued use of this article is attended with great hazard in increasing the morbid action of the mouth and fauces, and hastening the sloughing of these parts. Except, therefore, in the congestive form, other cathartic substances, which are also less liable to create a general disturbance of the nervous system, may with more advantage be used.

Under this course, some degree of reaction will probably be observed, when bleeding, either by leeches or by opening a vein, is indicated. The blood should be carefully and slowly abstracted, and the effects on the circulation ascertained, by keeping the finger on the pulse. If this evidently sink, it will perhaps be necessary to administer some mild stimulant, as wine whey or snake-root. The latter is peculiarly calculated to augment the energy of the vascular system, whenever it needs support, and where, at the same time, it will scarcely bear the excitement of an active stimulant. In eruptive diseases, under the circumstances now under consideration, where an action on the cutaneous surface is needed, it is highly valuable, as it promotes the functions of the skin. Camphor, as before remarked, when speaking of collapse, which possesses a similar action, may also be beneficially prescribed when a mild stimulant is needed, and the action of which on the surface is desired. Serpentaria may be used in infusion, made with a drachm to four ounces of water, of which a tablespoonful may be given every two hours to a child of five or six years. When the sinking is great, and the danger from this state is imminent, ether may be combined.* In the management of these cases, the object is both to unload the vessels, and give them an opportunity of contracting and acting on their contents, and to preserve the system from any further loss of vital power.

These are only to be obtained by closely watching the effects of the means used, and to lose no time in taking advantage of opportunities as they arise, for promptly meeting the morbid conditions, as they are indicated by the symptoms. The loss of too great a quantity of blood, or its too sudden abstraction, may place the patient beyond hope. It therefore needs the nicest judgment, as well in respect to the quantity taken, as in the precise period of the disease at which this remedy should be resorted to.

It may in some instances be best to commence the treatment by bleeding; but whether this be resorted to at the commencement or not, the application of external revulsions, in the form of sinapisms, or simple warmth applied by means of a flannel, wrung out in hot water, should never be neglected, as upon them will very materially depend the restoration of arterial action. On the contrary, the use of internal stimulants may be required only in very few instances, and as a general rule only where the pulse is observed to be rapidly sinking, and where a greater loss of vital energy is evidently taking place, instead of the reaction, which it is our object to effect by relieving the loaded vessels. Any of those above-mentioned, with warm, stimulating drinks, should be given until the pulse rises; a further, but cautious abstraction of blood may then be made, while the surface is preserved warm.

Where the head is preternaturally hot, cold may be applied after reaction has commenced, while warmth is continued to the lower extremities. This also requires some caution, as the too sudden lowering of the temperature, like the loss of blood, will but add to the loss of vital power, on which the congestion depends.

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* ℞ Rad. Serpent., ʒvj.
Aquæ Fervent., ℥viij.
Infuse for four hours, and whe
cold, add
Spts. Ether. Sulph., ʒj. M.
A dessert-spoonful every hour.

It is only by thus ascertaining, from actual experience in the individual case, what the system will bear, that we can hope to be successful in cases of congestion. This state is not to be overcome by leeching alone, so indiscriminately resorted to in almost every case of this nature, as the experience of every one will fully testify; but by a judicious combination of those measures which will directly relieve it, and such as by their stimulating action on the heart will indirectly contribute to effect the same object; for this state differs from inflammation, where such measures are incompatible. In these sudden cases, therefore, nothing can justify the physician in leaving his patient, until he can with safety direct a course of treatment which needs no change, at least for several hours: until he has seen reaction established, or the patient is in reality beyond the resources of art.

These remarks are also applicable to the other form of congestion above described; that of the pulmonary system and heart. It would appear, however, that the loss of blood is less apt to be followed by reaction than in congestion of the brain; at least this is the result of my experience. The skin, from being highly injected and of a deep red, will suddenly become pale and mottled, after the loss of a very small quantity of blood, even by the leeches which have been applied around the throat, while no action takes place in the arteries to supply this loss, which the rapid sinking of the pulse and greater difficulty of respiration evince. The reasons just urged for a judicious combination of remedies, apply, therefore, with equal, if not with greater force, to the form of the disease now before us; for the simple abstraction of blood appears scarcely to have any other effect than to drain off the blood from the cutaneous surface, to lessen the heat of the body, and to lower the vital powers. The treatment of such cases can differ but little from the other form of congestion.

With regard to the congesto-inflammatory symptoms which the disease so frequently exhibits, and those occasional complications which we have seen sometimes attend the disease, the different measures which are suited to the most prominent morbid conditions are those which the physician, according to his judgment, is to adopt. No positive directions can be laid down and no other rules adopted than the general principles of science, keeping in mind that congestion of important organs is far more dangerous than simple inflammatory action.

The principles of the treatment of this disease can not be better summed up than in the language of Dr. John W. Francis in a note to Doane's edition of Good's Study of Medicine. "The treatment," says he, "must be regulated by many concurring circumstances; in its simplest form, it is almost supererogation to interpose art, where nature is so judicious in her operations; in other cases, mild aperients, sudorifics, simplicity in diet, and attention to cleanliness, may often suffice. In its complex form, with sore throat, our indications are of a more discriminating order, and challenge our severest judgments and most effective capabilities. A difference in pathological opinions must necessarily lead to a corresponding difference in our curative means; as, for instance, whether we deem the existing state of disordered action to depend mainly upon the asthenic or sthenic diathesis, upon debility or increased energy. Too exclusive an adherence to either belief has been a prolific source of evil; the practice of viewing scarlatina as a disease of debility, has induced many to recommend early bark, wine, alcohol, and the diffusible stimuli, with cordial nourishment, after the method of the older alexipharmic prescribers, and to deprecate all antiphlogistic medicines. After this manner, in order to support the strength, have many epidemical or pestilential disorders at various periods been treated; I need not add with what pernicious results. On the other hand, without due consideration of the specific character of scarlet fever, of the laws which regulate febrile infection, and of the uniform influence which diseases of such origin have in their tendency to induce a greater expenditure of the vital powers, other prescribers have urged, even in the advanced state of the complaint, the antiphlogistic method, by copious bleedings, emetics, drastics, cold effusion, and other potent agents, on the ground that all the morbid phenomena depended upon an active inflammatory diathesis. Of the consequences of such a pathology, we have too many fatal examples."

The treatment of dropsy following scarlet fever is of considerable importance, from its extreme obstinacy, and at times fatal termination. This tendency may be induced by the premature use of tonics, as well as by the exposure to cold and damp air. It has been remarked that it is more common in the colder seasons of the year, and is unquestionably connected with the tender and susceptible condition of the skin remaining after the inflammatory state, which exists more or less in every case of scarlet fever.

Bleeding from the arm, early in the disease, is the most efficient means of breaking up the morbid condition on which the disease depends; and a decided impression will be at once made on the circulation, and the system thus prepared for the action of other remedies, if the swelling do not at once disappear. Next to bleeding is the application of leeches over the seat of the kidneys, and the flowing of blood should be maintained for two or three hours after they have separated. These, however, should never be relied on when there is any febrile action, where a vein can be opened. In severe cases this is indispensable, when the blood should continue to flow until the pulse gives evidence of the effect on the circulation. After this, the use of diuretics becomes necessary, if the secretion from the kidneys be not restored by bleeding. A solution of the acetate of ammonia, combined with spirits of nitre and a small quantity of tartarized antimony, will be found one of the most efficacious adjuncts to venesection for a speedy removal of the disease, especially if accompanied by the use of the warm bath. Nitrate of potass or digitalis will sometimes act on the kidneys when other measures have failed. A solution of supertartrate of potash, properly sweetened, is also a useful drink, and which children very easily take. Its purgative and diuretic properties render it highly useful when there is much febrile excitement.

There are some rare instances in which there exists rather a relaxed and debilitated condition of the body, marked by an absence of all febrile action. This leuco-phlegmatic state is a very uncommon occurrence, dropsy seldom being unconnected with some evidences of febrile irritation. The German physicians advise the more stimulating diuretics, such as squill, tincture of cantharides, or spirits of turpentine; and it has been necessary in some cases to resort to tonics, where other measures have failed. Calomel, in large doses, sufficient to operate on the bowels, has also been used and considered as the most effectual remedy.

Where diuretics will not affect the kidneys, an attempt may be made in severe cases to carry off the superabundance of fluid by the skin. Dr. McLean, many years since, in the New York hospital, succeeded under the most unpromising circumstances, with the warm bath, followed by Dover's powder. A most copious sweating follows the use of these measures, and an entire relief to all the dropsical symptoms. To an adult he prescribes five grains of Dover's powder every two hours, until four doses are taken.

In the inflammation of the ear, attended with a discharge, the application of leeches, and a large emollient poultice, covering the whole of the ear and the punctures of the leeches, are the best remedies when the affection is discovered early. These, with a strict attention to the state of the bowels, will prevent all unpleasant symptoms. The early use of these measures can only be resorted to when the child is old enough to give timely notice of the presence of pain in the ear. In young children, tedious suppuration is very apt to occur; the use of poultices, and frequently syringing the ear with warm water, will generally effect a cure. In very obstinate cases a blister behind the ear will become indispensable, and a permanent discharge from the blistered surface should be kept up, until the symptoms are alleviated. In chronic cases, a weak solution of sulphate of zinc, or of the nitrate of silver, may be necessary to change the action of the secreting vessels of the part. The fauces should be carefully examined, and if chronic inflammation or ulceration continue, nitrate of silver should be applied, as the affection of the internal ear is sometimes kept up by continuous sympathy.

The rheumatic affection is sometimes very severe; it is best treated with the warm bath, diaphoretics, and purgatives. The tincture of colchicum, so beneficial in ordinary rheumatism, may be advantageously employed in the treatment of this form, as it combines many qualities which render it applicable to the sequelæ of scarlatina, which is characterized by great irritability, febrile action, and often a suppression of the urinary secretion.

The rigidity and contraction of the tendons of the muscles is sometimes very great, and of long duration. Frictions, with stimulating liniments, are the means usually resorted to for the removal of this affection. In one very obstinate case, where the flexor tendons about the knee joint were very much contracted, relief was obtained from the use of liniment made with the oil of cajeput, freely rubbed on the part twice a day.

From all the facts connected with the development of the sequelæ of scarlet fever, it is evident that more or less of inflammatory action exists, and that depletion is the most proper remedy as a preventive, either during the existence of the pathognomonic symptoms, of the disease, or when convalescence is marked by restlessness, dryness, and heat of the surface.

RUBEOLA.—MEASLES.

The first who described measles was Rhazes, although he does not speak of it as a new disease. It appears to have been confounded with small-pox, as he takes some pains to distinguish between them, and observes that the inflammation of the whole body, the inquietude and general distress during the febrile stage, are much greater than in variola, although all the early writers have maintained an affinity between the two diseases.[*] Willan has endeavored to prove that it was known to the Greeks and Romans;[†] but there are some doubts in relation to this fact, and also with reference to its appearance in Europe before the fifth century.

The first accounts we have of measles in America is about the year 1518, when it was imported from Europe.[‡] No records exist of its prevalence in North America until 1713; since that time it has occasionally spread through different sections of the country, and often with great severity.

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[*] The Medical Works of Dr. Richard Mead, vol. iii., p. 151; London, 1763.

[†] Miscell. Works; London, 1821.

[‡] D'Anhiera de Rebus Oceanicus, etc. Quoted by Rayer.

ETIOLOGY.—In by far the greatest number of instances measles occurs in young children, and even infants at the time of birth have been seen with the traces of the eruption. It is one of the peculiarities of all eruptive fevers, that the first period of life is the time when they make their invasion; and the exceptions to this law are so few in number, as to be of little account in affecting its universal application. Measles more frequently attacks children after the period of dentition than before.

It arises from some specific cause, of a nature unknown, and usually shows itself as an epidemic, during the cold and changeable weather at the close of the winter. Although generally appearing at this season, yet there are cases constantly to be found throughout every part of the year. It is communicable by infection or contagion, and has been transmitted by inoculation with the blood of those affected with it, and also with the tears and saliva.* Dr. Dewees, however, states, that attempts were made in the Philadelphia Dispensary to produce the disease by inoculation, in the year 1801, with the blood, tears, and the secretions from the nasal and bronchial membranes, and also with the exfoliated epidermis, without effect.† On the authority of the late Colonel Green, it is confidently stated that his relative, Dr. Green, of Greenwich, R. I., inoculated in the year 1799, three young persons in his circle, with blood taken from the eruptive surface of a patient laboring under an aggravated form of measles; and that these cases of inoculation were entirely successful, so that the distinctive characters were recognised by all who saw them.

This disease appears to be easily transmitted, when once it occurs, and it is not often that many children in the same house escape it, when exposed to the influence of the contagion. It is not, however, so easily communicable as small-pox or scarlet fever. Some persons do not possess the predisposition for the development of the affection; for repeated exposure, even in the same bed, has not been sufficient to produce it, while others similarly exposed were attacked; yet the disease is so common, as to have induced the belief among some that there is, in all probability, no individual who remains throughout life insusceptible, although he may have been previously unaffected.

In general it attacks a person but once, but to this there have been exceptions; and there has not only been a second, but even a third attack.‡ The occurrence of a second invasion is so rare, that

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* Gentleman's Mag., 1766, p. 187.

† Dewees, Op. Cit., p. 417.

‡ Burserius, vol. ii., p. 446.

Rosen, during forty years' experience, never knew of one.* Willan never saw a second instance of measles in the same person. Eberle has seen but one.† Rayer mentions the occurrence of the disease a second time in three instances; and also mentions the fact of Genovesi and Duboscq having prescribed for several persons, children as well as adults; among the former, as many as forty-six in one epidemic, who had before passed through the disease.‡

It appears to be variously modified, according to the peculiar constitution of the atmosphere; for different degrees and forms of this disease have been described at different times. Hence a variety of names has been given to the various modifications, according to the atmospheric influence, and the effect of different idiosyncracies. The former exerts a marked influence on the character of the disease; it being more aggravated during cold and changeable weather, with much greater inflammatory symptoms, or severe pulmonary congestion, than at other times.

Morton regarded the mild form as a sporadic disease, while the severe and malignant arose from epidemic causes. This, however, is not the case; for the most benignant kind has, as is frequently seen, prevailed as an epidemic.

SEMEIOLOGY.—The common measles, or the disease in its most simple and uncomplicated form, begins with the ordinary symptoms of febrile affections, with the additional signs of slight inflammation in the respiratory passages, more particularly in the nares. On the invasion of the disease, therefore, there are alternate feelings of chilliness and heat; and, on the second day, an increase of the febrile symptoms, occasionally very severe, with great thirst, a white tongue, and a remarkably free secretion of thin mucus from the nostrils, attended with sneezing. The eyes are also red, and the tears flow freely. There is also a sensation of weight in the epigastric region. Cough usually shows itself at this period of the disease, but is not severe. A great drowsiness not unfrequently attends the other symptoms, and in young children some slight convulsions will appear. All these symptoms are increased on the third day; the eyes become acutely insensible to the light; the cough is dry and hoarse, great determination takes place to the brain, which in teething children is often relieved by a free diarrhœa. In older children there is delirium, with starting in the sleep, high excitement, hard and frequent pulse, and a hot skin.

On the fourth day the eruption appears on the face, in the form of small red spots, resembling flea-bites, particularly around the mouth, on the cheeks, and forehead. It spreads successively on the neck, chest, and limbs, within twenty-four hours after its first appearance on the face, and is attended with great itching and heat.

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* Quoted by Burserius, vol. ii., p. 446. † Op. Cit., p. 429. ‡ Rayer, p. 148.

These spots enlarge, unite, and form clusters, having a semicircular shape, the skin in the interstices being of the natural hue. During the height of the eruption, an elevation of the affected part may be distinctly felt, particularly on the face, which in severe cases is considerably tumefied. About the same time, spots of a dull red color show themselves on the uvula, velum, gums, and other parts of the buccal membrane; while a sense of dryness and huskiness is felt by the patient in the throat. On the following day the eruption appears to be nearly confluent, and is completely developed on the face; while the constitutional symptoms continue without abatement until the eruption begins to decline, when they likewise decline, and the local affections of the eyes, throat, and nares, also disappear. In light cases the symptoms of pulmonary inflammation also disappear, but in many instances the cough and sense of oppression in the chest remain after the eruption has disappeared, and will continue for some time during convalescence.

This fading of the eruption commences about the sixth or seventh day from the invasion, in the same order it observed in its appearance, commencing at the face; it changes to a yellowish color. The epidermis becomes detached in a scurf, and a troublesome itching continues over the skin, which remains dry and rough. At this period of the disease it not unfrequently happens that the coma returns in young children; it does not, however, appear to be attended with danger. The occurrence of diarrhœa at this stage is not unfrequently noticed, and appears to be critical, particularly in teething children.

Such is the course of ordinary measles; but different modifications of it have appeared, either from the action of a more than usual malignancy in the exciting cause, or from the effect produced by a peculiar idiosyncracy and the excess of inflammatory action, or the existence of local congestion in important organs. The earlier or later appearance of the eruption of itself does not interrupt the regular course of the disease. It has sometimes not shown itself until the seventh day, and then passed regularly through its stages.

The disease at times presents other symptoms, marking a greater or less degree of departure from the regular course above mentioned. Thus the imperfect form, or that in which there exist no catarrhal symptoms, but the cutaneous eruption observing its regular course without any febrile excitement, is at times noticed amidst the disease in its most inflammatory form. This does not appear sufficient to protect the system against the contagion, for, after an indefinite period, according to Willan, the development of the ordinary measles has occurred.

On the contrary, another form of the disease has been described by Gregory and Guersent, where all the symptoms of measles, except the eruption, appeared in the midst of an epidemic. This is the morbillious fever of some authors. Sydenham describes a fever of this kind, which was marked with no other eruption than patches on the shoulders, which never appeared in any other part of the body.

Another, and the most common occurrence in measles, when severe, is the excess of the local inflammatory symptoms. There is then great pain in the head, and sometimes delirium, severe cough, with pain in the chest on respiration; the accompanying fever is severe, pulse hard and quick; and, in short, the usual signs of local inflammation, of greater or less severity, manifest themselves from the commencement of the initiatory fever.

The black measles, Rubeola *nigra*, of Willan, is a very rare disease; indeed, I do not know that it has occurred, as described by him, in the United States. Livid and dark-colored eruptions appear in some severe cases of the disease, when attended with great congestion about the lungs; but this is not the kind described by Willan, which is marked by a change in the eruption on the seventh and eighth day from the invasion, to a dark, livid color, mixed with a shade of yellow. This appearance occurs in persons of a debilitated constitution, or who have been exhausted by severe diarrhœa. It has also been remarked in those who have been affected with tubercles in the lungs.

Measles, with typhoid symptoms, will at times appear among the children of the poor, who suffer from want of proper food, and from the air of their confined habitations. It is like that just mentioned, of very rare occurrence. It is attended with colliquative diarrhœa, hemorrhages, and, on its invasion, with a remarkably pungent heat of the skin, like the worst forms of scarlet fever, which in some of its symptoms it closely resembles. This disease may be complicated with other inflammatory affections than those of the lungs and bronchiæ, above mentioned. Severe attacks of croup have taken place during the progress of the disease; and an active inflammation of the meninges, brain, of the eyes, and gastro-intestinal membrane, at all times complicate the disease, and render it more or less difficult of management. The latter especially demands close attention, from the influence it exercises on the proper development and progress of the pathognomonic symptoms of measles.

When complicated with gastro-intestinal inflammation, the disease is attended with much pain in the head, a dark fur appears on the tongue, and there exist considerable tenderness and fullness of the epigastrium. In this complication there is more obstinacy in the vomiting, which attends at times the commencement of the disease;

and when purging occurs simultaneously with the appearance of the eruption, or at the period when it is expected to show itself, the latter is imperfectly developed, being pale and irregular, both in appearance and extent. The irritating and incessant cough, and difficulty of respiration, also attend this form, but destitute of the ordinary marks of active pulmonary inflammation. This complication of gastric inflammation is, next to the typhoid and congestive kind, the most obstinate, while it is the most common of the complicated varieties of measles.

When the disease attacks, by producing a congestion of some of the internal organs, no reaction takes place, or it is very imperfect. The surface is pale, with a livid appearance of the lips, and a sunken expression of the face. Sometimes patches of a bluish color appear on different parts of the body. The congestion occurs in most instances about the lungs, and a state of coma, or an attack of convulsions, takes place very quickly after the invasion of the disease. Young children of a delicate habit are very easily overpowered by the contagion; and congestion, from the rapid exhaustion of vital power, very quickly ensues. Convulsions, also, often occur, especially in young and teething children, on the invasion of the disease, without any other premonition.

The consecutive effects of measles are, chronic bronchial inflammation, inflammation of the eyelids, chronic enlargements of some of the lymphatic glands, pustular eruptions over the limbs, back, and groins. Chronic bronchial affections, and of the pulmonary mucous membrane generally, with an obstinate and long-continued cough and huskiness of voice, are the most common sequelæ of measles. Phthisis, also, is often developed by an attack of this disorder. These pulmonary affections are extremely liable to occur afresh, on the slightest exposure to cold and damp, for a long time after a severe attack.

The nature of the disease may be suspected during the initiatory fever, by the redness of the eyes, the flow of tears, sneezing, and a flow of thin mucous from the nose. There is at the same time a distressing dry cough, when these symptoms show themselves in those who have not before had measles. When it is prevailing, there can scarcely exist a doubt as to the nature of these symptoms. The eruption shows itself in minute elevated spots, so closely resembling those of small-pox or varioloid, as not to be at first distinguishable from them; but they very soon coalese, and exhibit the appearance of stains.

The disease with which it is most apt to be confounded, is scarlet fever. In the last-mentioned affection, the color of the skin is more continuous, does not exhibit a clustered form, with intervals of a healthy color, with semi-lunar edges. On the first appearance of the rash in measles, small red points show themselves, which unite at their edges, are less highly colored, and impart a kind of spotted appearance to the skin ; while in the scarlet fever the redness is more diffuse and uniform, without the maculated appearance of the other. In measles the eruption usually appears on the fourth day ; in scarlet fever, on the second.

When simple, and uncomplicated with local inflammation, measles is not a disease of danger, and the prognosis, with ordinary care, may in general be favorable. Any irregularity in the appearance of the eruption, as its retrocession from whatever cause, must be regarded as affording an unfavorable prognosis. So, also, the appearance of patechiæ, or hemorrhage, connected with the eruption, is to be regarded as indicating great danger. Congestion and inflammation about the lungs, more especially in young infants, are highly dangerous symptoms, particularly in those of a delicate constitution.

Morbid Anatomy and Pathology.—Recent investigations show, that the seat of the eruption is in the reticular tissue of the skin and the pulmonary mucous membrane ; these parts being found injected after death. Inflammation of the membrane covering the bronchiæ and intestines, and the usual morbid secretions that are found on these inflamed surfaces, are all the changes discovered in fatal cases of inflammatory measles. In complicated cases more extensive lesions are discovered, according to the parts implicated, but more especially a loaded state of the lungs and their capillaries in severe congestive cases. In those less strongly marked by inflammatory symptoms, no changes whatever can be found on dissection.

The nature of measles is essentially inflammatory, as the symptoms and post-mortem examinations show. It has, however, prevailed at times with highly malignant symptoms, characterized by a great prostration of strength, and a congestion about the lungs. This loss of energy in the larger vessels produces the feebleness in the capillary circulation, which may arise from the action of the contagious principle, or from debility in the child, whereby reaction is imperfectly established. This is more frequently found to be the case among the children of the poor, who suffer from bad food and impure air. The effect of overheated stove-rooms is to increase the tendency to excessive congestion of the lungs, and to impart an appearance of malignancy to the disease. In the latter part of the seventeeth and the beginning of the eighteenth centuries, measles appears to have been particularly marked by congestive and malignant symptoms, which have been described as a putrid form by Huxham and Morton. The epidemic measles of London, which prevailed ahout the year 1765, is described by Dr.

Watson as of a similar nature. All these cases are more probably congestive and irregular forms, arising from a feeble reaction in the system, producing both an accumulation of blood in the centre of the circulation, and from the effect of imperfectly-purified blood in the lungs, imparting to inflammation of the skin and mucous membrane an erysipelatous and gangrenous tendency. Where the rash has receded, and great debility ensued, with oppressed breathing and anxiety, this congested condition evidently exists, as is proved by dissection.

TREATMENT.—This disease, like other eruptive fevers, observes a regular course, with a natural tendency to a healthy termination. The treatment, therefore, in the mild variety, ought to be of the simplest character, as the adoption of active measures will but disturb the disease in its proper course; and in debilitated subjects even the powerful action of a purgative is attended with hazard, by causing an excessive irritation, and a transfer of the capillary action from the parts where nature has seated it, to the more dangerous location, the gastro-intestinal mucous membrane.

Where the disease is unattended with much pulmonary disorder, it is scarcely necessary to prescribe anything more than the mildest aperient, followed by warm diluents, as barley water, lemonade, or linseed tea; while the patient is kept in a moderately warm temperature. The feet may also be bathed with warm water, to preserve a proper action on the surface, and prevent an undue determination of blood to the lungs.

When the febrile symptoms are active, it will be necessary to have recourse to diaphoretics and expectorants. Syrup of ipecacuanha is an excellent medicine for this purpose for infants, and may be given in the following combination.[*] It may also be prescribed alone, while its diaphoretic effects are promoted by the use of warm drinks. For older children, of a robust habit of body, small doses of antimony may be used. This, however, is a medicine requiring great caution in young children, from the extreme exhaustion it is apt to produce. Its action is best promoted by combining it with acetate of ammonia and spirits of nitre.[†] Any of the expectorant and diaphoretic mixtures, under the head of pneumonia or bronchitis may be used in this disease, the prominent symptom of which, that needs the interference of art, differing but little from the ordinary inflammation of the air-passages of the lungs. With such a course of treatment, the greatest number of cases of ordinary measles will pass through their different stages with safety.

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[*] ℞ Syrup Ipecac., ℥ss.
" Tolu, ℥ss.
Aquæ Glycyriz., ℥ij. M.
A teaspoonful every two hours to an infant.

[†] ℞ Liquor. Amon. Acetat., ℥v.
Spts. Nit. D., ʒij.
Vin. Antim., ʒiss.
Syrup. Simpl., ℥ij. M.
A dessert-spoonful for a child three or four years old.

It is not necessary, whenever there are oppressed breathing and a laborious pulse, during the formation of an eruptive fever, to resort to blood-letting; for, as Dr. Willan observes, these symptoms are common to all fevers of this kind, and usually disappear on the appearance of the eruption. But when the fever and laborious respiration are accompanied with pain in the chest, the usual symptom of inflammation, it then becomes necessary to resort to general blood-letting for its relief, if the general condition of the patient do not forbid its employment.

When inflammation of the lungs exists, blood-letting must be our main resource, as upon the removal of the inflammation will depend the prevention of those serious and sometimes fatal consequences which occur from uncontrolled inflammation of these organs.

It has been the remark of most practical men, that children bear blood-letting in measles better than in any other disease; and it is more particularly useful on the third day of the eruption, if the dyspnœa and cough continue, and especially if the breathing or cough be attended with pain. The overloaded state of the lungs, also, by impeding the circulation in the brain, disposes the child to convulsions, which can not be better prevented than by blood-letting. At this period, also, the same objection does not exist to the employment of active measures, as in the forming stage of the disease; reaction having become fully established, and the specific action of the disease having become decidedly inflammatory.

The foundation of phthisis is often laid in an attack of the measles. Every precaution, therefore, should be used to control the exciting cause of this disease. When, therefore, there is much arterial action, with unequivocal evidences of inflammation, bleeding is imperiously demanded; and should be employed by opening a vein in the arm, if the condition of the patient will admit of thus abstracting blood. Where there exists any doubt as to the propriety of general blood-letting, from any peculiarity of constitution, or from some complication of the disease, local blood-letting must be substituted, either by leeches, or cupping on the chest or between the shoulders.

Whenever there is a local determination of blood to any of the viscera, producing an inflammation of important organs, prompt bleeding becomes our chief resource; the complication rendering the disease far more hazardous than what would arise from an interference with the regular progress of the eruptive fever. Where the excess of inflammation is in the lungs, it will not probably be so promptly relieved by bleeding as ordinary pulmonary inflammation, or as in a complication of the other organs with measles, as that of the brain; for the morbillious inflammatory affection of the lungs has a determinate course, and the object of the physician must be to moderate and control in some degree the inflammation, and thus prevent any injury to the lungs or bronchial membrane, or the deposition of tuberculous matter from the excited and deranged action of the part.

One of the most common causes of an excess of pulmonary inflammation in the lungs in this disease, is an imperfectly ventilated apartment, or a too high or too low degree of temperature. The former is much more apt to occur, producing, besides a congestive state of the lungs, a high degree of fever, and great restlessness. The apartment, if possible, should be large, and the temperature not less than 60°, nor more than 70°.

Where the cough and pulmonary difficulty remain unabated, and the arterial action has become moderated, blisters will generally be found useful; and I think I have found them more beneficial in the slight remains of pulmonary inflammation of measles, than in the common inflammation of the lungs. They should be applied with the same caution in infants, bearing in mind that the action of a blister in this disease is much quicker than where there exists no inflammation of the skin.

An inflammatory form of measles existed in the year 1828, in Paris, which although in almost every form was complicated with inflammation of important viscera, and more especially of the lungs, yet would not admit of sanguineous depletion. In such cases blisters would be of important service; and Dr. Elberle is of opinion that calomel and opium would be the most proper treatment in such cases.*

One of the most distressing things in measles is the continued harrassing cough, which should, in the active stage only be treated by the expectorants already mentioned, and the adoption of a general antiphlogistic course. When, however, the inflammatory symptoms have been in some degree controlled, and the cough continues, great relief will be experienced from the use of an anodyne, which will also greatly relieve the extreme restlessness arising from the cutaneous irritation. It may be composed of morphine, combined with the syrup of squills.† When there is much accumulation of mucus in the air-passages, great relief will be found from the use of gentle emetics.

It not unfrequently happens that great irritation and inflammation of the gastro-intestinal mucous membrane occur in the course of the disease. This condition is usually attended with a quick

* Op. Cit. p. 441.

† ℞ Syrup. Scillæ, ʒij.
Aquæ, ʒvi.
Morph. Acet., gr. ss. M.
A teaspoonful two or three times a day, for a child of six years of age.

pulse and loss of strength, followed by diarrhœa. When first noticed it is more easily relieved by bleeding, warm bath, and a freer use of demulcent remedies. All irritating substances should be withheld, especially antimonials and purgatives. The latter, especially, only aggravate the existing difficulty and greatly prostrate the patient. Great benefit will be derived from the application of a soft poultice, sprinkled with powdered camphor, applied over the abdomen. While these measures are used, the irritation of the affected part may be calmed with small doses of laudanum, administered by the mouth; or if the irritation exist in the lower portion of the intestines, producing symptoms of dysentery, a complication sometimes noticed, it may be given in an enema of starch or infusion of linseed.

In every congestive form of measles it will be advisable to have recourse to gentle blood-letting by means of leeches, carefully watching their effects, and if the pulse flags, to excite the energies of the circulation by mild stimulants, both externally and internally used. In the loaded state of the lungs, it will be useless to attempt the establishment of the arterial action without unloading the larger vessels, and thereby giving them an opportunity to act, while at the same time the great loss of vital power forbids the free abstraction of blood; a medium must be carefully observed. So, also, cerebral congestion will sometimes ensue, and the system will not react; but the skin continues pale, and the pulse feeble and languid. The eruption, also, after it has made its appearance, will sometimes recede, and leave the surface of the body in the same condition. The smaller vessels appear, under these circumstances, to have lost their power; it will therefore be necessary to employ powerful stimulants to the surface of the body, that they may be brought into action. A warm bath of salt-water, flannels wrung out in hot whiskey, frictions with capsicum, or mustard cataplasms may be applied to the epigastric region and to different parts of the body; and, in short, the measures recommended for treating congestive scarlet fever may be used in this form of measles.

There is much more hope of succeeding with these measures, where the rash has receded after it has once made its appearance, than where no reaction has occurred. It is more often the case, also, that the child will bear bleeding, either locally or generally, better, when this congestive condition occurs at the commencement of the disease, than where it arises during its progress. The former, it would appear, often needs but little more than an unloading of the blood-vessels, perhaps to a small extent, in addition to the other means already mentioned; but in the latter there is the necessary derangement of all the vital functions, attendant on a continuance of the diseased action, with perhaps the existence of local inflammation, which has been lighted up during its progress. This complication of disease imparts to it therefore a character, which too often renders it unmanageable.

In some epidemics a loss of energy in the system marks the disease, producing the malignant or typhoid form, in which it is said that the most active stimulants are needed. Dr. Watson describes the epidemic measles at Edinburgh, in 1816, to have been of this character.* It was accompanied with great swelling of the face and eyelids; and the eruptive stage was attended with symptoms of great severity, as coma and delirium. The fauces were deep red, as in scarlatina, and the eruption tardy and imperfect, and very irregular in its duration. Its appearance was sometimes red, pale, livid or dark, with a general prostration of the powers of the system. Such cases, it may be expected, would occur where there was great poverty, with badly ventilated habitations. According to the experience of the practitioners in this epidemic, bleeding was attended with hazard; and stimulants, such as wine, cordials, and aromatics, were required. There can be no question but the mode of life greatly modifies the nature of diseases of this kind, for measles having typhoid symptoms has been noticed among individuals previously broken down by other diseases; here it is obvious, depletion must be attended with hazard. Dr. Watson remarks, with reference to the epidemic above mentioned, that the patients lost more by the bleeding than was gained by the relief given to the pulmonary affection. The treatment of such cases probably would be best managed by a judicious combination of small local bleedings and mild diffusible stimulants.

From the tendency which exists during convalescence to inflammatory action in the bronchial membrane, great care must be taken, by preserving the bowels soluble, and keeping the patient from the influence of cold, to prevent any permanent affection in these important parts. The diet should be for some time rather of an abstemious nature, if there continue to be bronchial irritation, and other evidences of the remains of inflammatory action. The clothing ought also to be sufficiently warm to preserve a due action in the cutaneous system. Tonics during convalescence should in general be avoided, on account of the tendency to inflammation. When any difficulty of breathing, or pain in the chest arises, blood may with safety be drawn from the arm, or a few leeches may be applied over the inflamed part, the feet immersed in a warm bath, and a sudorific anodyne administered at night.

During convalescence it is not unusual for a diarrhœa to arise, and, when moderate, it assists much in relieving the inflammation in the larynx and lungs, so common after an attack of measles. It may for the most part be left unchecked, but when excessive, should be arrested by Dover's powder and absorbent medicines. The frequency of this diarrhœa has induced some practitioners to attempt to imitate the process of nature, by the administration of mild purgatives.

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* Edinburgh Medical and Surgical Journal, 1817.

For chronic bronchial affections, which continue, notwithstanding the remedies above mentioned, for some time beyond the ordinary period of convalescence, blisters on the chest, and rubefacients over different parts of the limbs, will always be found useful.

VARIOLA.—SMALL-POX.

It has been a subject of no little controversy, whether or not small-pox was known to the Greeks and Romans. Dr. Good inclines to the opinion that there exists no substantial reason for believing that it was, and that there is no evidence of its existence in the Mosaic era; in which idea he is supported by the opinions of Drs. Friend, Mead, and Gregory. The other side of the question has the able names of Rhazes, Avicenna, Salmatius, and, more recently, of Willan and Baron, of England.

Although it is difficult to ascertain the period of its first appearance in different countries, yet there is every reason for believing that this disease has been known and described in different ages and countries, from the earliest period of which we have any historical record. The disease probably existed at a much earlier period than is usually believed.* It was in China long before it was known in Europe; and the earliest history, the Bible, contains the account of an eruptive disease, which, in the opinion of some judicious critics, bears all the characteristics of small-pox. Dr. Baron is of opinion that it prevailed nearly fifteen hundred years before the Christian era, according to the commentary of Philo, a learned Jew, on the passage of Exodus, describing the boils and blains of Egypt. This account of the disease is a remarkable description of small-pox. This period also accords with the traditions of the Chinese and Hindoos, as to the time when it first appeared. The disease of Job, it has been supposed, was the small-pox;† and, although it has been found a subject of extreme difficulty to settle the point of the time in which he lived, yet, according to the system of chronology of Usher, it could not have been far from that already mentioned as being the period when the Egyptians were affected with the blains and boils.

The first distinct account, according to Mead, of the disease having been traced from one country to another, is that of its conveyance in a vessel from China to Arabia in the sixth century, whence it was introduced into Europe through Africa by the Moorish army; Sicily and Spain being the places where it first appeared.

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* V. Dr. Baron's Life of Jenner.

† Medica Sacra, by Thomas Shapter, M. D.; London, 1834.

The precise time of its introduction into Great Britain is uncertain, but it appears to have been common there about the end of the twelfth century; and it is well known, that within the last two, it has been one of the most dreaded scourges that ever visited that land, until the discovery of the immortal Jenner deprived it of its terrors.

The earliest account we have of the existence of small-pox in America, is its prevalence among the Indians in the year 1633,* no doubt introduced among them by the first visits of the colonists. In 1638, a general fast was observed throughout America, among other reasons, on account of the "small-pox and other fevers."† Since that time, historical records abound with statements of its frequent prevalence in every part of the continent.

ETIOLOGY.—The cause of small-pox is a specific animal poison. It will operate through the atmosphere, and follow the direction of the wind, the air being loaded with the infectious principle; the disease, therefore, is communicable as well by respiration, as by the contact of clothing, bedding, etc., of the sick, and by the direct introduction of the matter from the pustules. This fact is proved by many instances, occurring on a simple exposure to the atmosphere of an apartment where a patient is ill with small-pox, without any contact with the affected person, or with his clothes.

The contagion, like that of other similar diseases, is much modified by an unknown principle in the atmosphere, whereby it has at times spread rapidly as an epidemic, sparing neither age nor any condition of life. When thus prevailing, it was observed to be more fatal in the heat of summer and cold of winter, than either in the spring or autumn. The constitution of the air, also, modifies it in such a manner as to render it at times, although prevailing as an epidemic, milder and less complicated than at others. The surrounding circumstances have a great influence in modifying the disease: thus, in confined places, especially in the basement of a house, it is more frequently confluent than in the higher parts of the same house. In the garrets, especially where the streets are wide and well-aired, it is often distinct, and generally more mild. Heat also greatly modifies the type of this disease. In a child kept hot during the eruptive fever, it is apt to become confluent, while another kept cool, will most likely have the distinct form.‡

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* A Journ. of the Transact. and Occurrences in the Settlement of N. E., by John Winthrop, Esq.; Hartford, 1790, p. 56.

† Webster's History of Pestilential Diseases, vol. i., p. 185.

‡ Armstrong, p. 480.

It is also greatly under the influence of the peculiar predisposition of the individual; some having the disease with scarcely anything more than a slight fever, and a trifling eruption, and passing regularly through its different stages; while others suffer with it in its most confluent form, with severe and protracted fever. If the patient be in ill health at the time of the attack, it will be more severe.

Although all are liable to be attacked with small-pox, yet it generally affects children and young people. Some persons, however, who have escaped in early life, have in old age become the subjects of this disease. Others, again, have remained through life entirely exempt from it. In general the predisposition to receive the disease is destroyed, when once the individual has passed through an attack. To this, however, there have been many exceptions.

The fœtus has been affected with the disease, as appears from the existence of small-pox pustules at birth, in numerous instances, recorded by Drs. Mead, Jenner, Laird, Forbes, Hosack, and others.[*] This has not only occurred where the mother was simultaneously affected, but where the mother presented at the time no trace, nor any indication whatever of an eruption. Such instances have been recorded by Mauriceau, Mead, Watson, Forbes, and several others.

The disease also has been caused by inoculation with the matter taken from the pustules, when it has been observed to produce a much milder affection than when taken in the ordinary course of nature. This fact early led to the practice of inducing the disease artificially; a practice which has been traced to the remotest period of which we have any account of the existence of the disease. It was common in China, India, and other parts of the Eastern World, where the small-pox first existed. It was also used in Africa before its adoption either in Great Britain or America.[†] In the year 1721, it was introduced into England by Lady Mary Wortley Montague, from Constantinople, where it had been in use for nearly a century. In the early part of the same year it was also introduced into Boston, by the Rev. Cotton Mather, who had read some occasional account of its practice in the East. In the extension of this prophylactic measure he was aided by Dr. Boylston, and three hundred persons were inoculated early in that year.[‡] It made considerable progress in New England before it was fully adopted in Great Britain.

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[*] A Dissertation on the Pathology of the Human Fluids, by Jacob Dyckman, M. D.; New York, 1814.

[†] The Rev. Increase Mather published "Several reasons for proving that inoculating or transferring small-pox is a lawful practice." Among others which he adduces, are the direct benefits derived from it, and refers to the fact, that "we have an army of Africans among ourselves, who have themselves been under it, and given us all the assurance which a rational mind can desire, that it has been used with the like success in Africa."—*Mass. Hist. Collect.*, vol. ix., p. 278.

Philosoph. Transact., vol. vi., p. 616.

The following account of this important transaction is from the Philosophical Transactions for the year 1723. "In May, 1721, the small-pox was brought into the town of Boston; in June it began to spread very much; and in the month of July it had got into most parts of the town, and a considerable number of people died of it. At this time inoculation was first practised by Dr. Boylston, who performed it on his own child and a negro servant, who both did well; notwithstanding which, this attempt gave great uneasiness to the neighbors."

Although opposition to it existed to a great extent, yet there was much less than in England, and it was soon practised by most of the physicians of New England.* Among the most strenuous advocates for this practice was Dr. Nathaniel Williams, who lived at Boston during the prevalence of the epidemic above mentioned: he died in 1737, leaving manuscript directions for the proper performance of inoculation, which were afterward published.† In the year 1780 Dr. Samuel Bard established an hospital in Dutchess county, New York, for the reception and management of patients inoculated with the small-pox.

SEMEIOLOGY.—Small-pox is usually divided into two forms; that in which the eruption is distinct, being but the milder variety of the disease, and that wherein it is confluent; differing from the other principally in the severity of the symptoms, and the greater number and size of the pustules.

The course of small-pox, through its different stages, may be divided into four periods, which will include every form the disease assumes, from the time of the reception of the poison to that of the desiccation or decline. The first is the period of incubation; the second that of fever; the third that of maturation, including suppuration; and the fourth that of desiccation.

The period of incubation includes the time between the reception of the infection and the first appearance of the precursory fever. The time is very uncertain, for small-pox has in some instances appeared to attack the individual almost immediately on being exposed to the influence of the contagion. There would seem, however, to be in general a determinate period existing before the manifestation of the primary symptoms. The difficulty, however, of ascertaining the fact, where there are no external signs of disease, renders it uncertain: it is supposed to be about the fourteenth day; Boerhaave and Stahl make it about the sixteenth or seventeenth day.

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* When first introduced into England, among other powerful opposers were some of the clergy, who publicly preached against the practice as highly sinful. The Rev. Mr. Massey preached at St. Andrews, Holborn, on the 8th of July, 1722, from Job ii. 7, against inoculation, as derived from the Devil, Satan being the first inoculator when he smote his victim with boils.

† The Method of Practice in the Small-Pox, with Observations on the Way of Inoculation, taken from the manuscript of Dr. Nathaniel Williams, of Boston, N. E.; Boston, 1732.

On the first appearance of the disease there are rigors, cephalgia and lumbago; the latter symptom, with a feeling of great debility, almost uniformly exists. In children, besides these symptoms, which are common to all ages, there will also exist a great drowsiness, with starting during sleep; and inequality of circulation is more marked in them, and the extremities are generally cold. There are generally pain and tenderness of the stomach, and sometimes vomiting. Some are attacked with convulsions a few hours before the appearance of the pimples; all are more or less agitated and easily terrified, especially on awaking from sleep. The fever is well marked, with great heat of the skin, and a deeply flushed face. In children there is a great dryness of the surface, in which respect they differ from adults, in whom there is often a free sweating, marked by a peculiar odor.

These symptoms continue for three days; and on the completion of this period, or perhaps early on the fourth day, small red spots will be seen on the face and breast, marking the beginning of the second stage of the disease. These spots bear a strong resemblance to flea-bites, but quickly change their appearance to small elevated pimples, enlarging both in width and elevation. These pimples gradually appear on different parts of the body, when there is usually a considerable abatement of the fever, nausea, and local pain. The pulse and hurried respiration, also, abate much in frequency, while the skin becomes relaxed and moist. The eruption assumes this red papular form about the fourth day, having a rough and knotty feeling; it continues to enlarge, and is of a deep red around the bases, while the summits appear a little whitish, from the secretion of a semi-transparent serum. A minute vesicle is thus formed on the summit of the pimple, slightly depressed in the centre. Various changes take place in the pustules, commencing with those of the face, on the fifth or sixth day. They are observed to become more extended, and surrounded with a red areola, while the seriosity with which they are filled changes in color and consistency, becoming yellower and thicker, having the appearance of pus. At this period the secondary fever arises, on the fifth day of the eruption, and continues through the whole period of suppuration; the face swells greatly; the eyelids are closed, and, in proportion to the progress of the pustules to maturation in other parts of the body, the tumefaction of the cellular membrane extends, becoming exceedingly painful and itching, especially that of the face and hands.

The completion of the eruption is on the seventh or eighth day, when the pustules are about the size of a pea, occupying not only the skin, but the mucous membrane of the mouth and throat. On the last-mentioned day the red ring begins to disappear, leaving the pustules white and opaque from the purulent fluid they contain.

The period of desiccation commences about the eleventh day, when the swelling of the face begins to abate, and a small dark spot appears on the apex of the pustule. This dark spot, caused by the drying of a small quantity of purulent matter which has escaped, gradually extends, until the pustule is converted into a scab, which falls off about the fourteenth or fifteenth day. On the body, the separation of the scab is not until a day or two after; while the pustules on the limbs, from the imperfect formation of the purulent matter, do not form perfect scabs, but dry scales, having more the appearance of thickened cuticle. The separation of these scabs and scales leaves depressions or pits where the former existed, and discolored patches in other parts, on which the scales were formed. This is the ordinary course of the distinct and mild form. Where the disease is severe, and the pustules confluent, there is more irregularity in the symptoms, and many anomalies in its progress.

The pustules, in the confluent or coherent variety, do not undergo the same regularity in their progress—there exist more inflammation, swelling, and pain; and, from the great number of the pustules, and their running together, the name of confluent is given to this form of small-pox.

The confluent form differs from the distinct or simple, principally in the violence of the fever, indicating greater constitutional derangement; in the greater number of the pimples, closely crowded together; their inflammatory nature, without perfect suppuration, and in the continuance of the fever, with very slight or no remission on the appearance of the eruption.

All the symptoms of fever which precede the eruption are aggravated in intensity, with greater evidences of congestion, than in the disease in its simple type. The oppression of the chest is greater; there is often a short, dry cough, with a frequent and oppressed pulse. Symptoms, also, of a partial congestion of the brain show themselves in the great drowsiness and delirium; convulsions also are liable to occur. There is also much greater manifestation of inflammation in the stomach and intestines, with greater and more continued nausea and vomiting. There is in every case of small-pox more or less difficulty of deglutition from swelling of the mucous membrane of the throat. This symptom is much greater in confluent than in distinct small-pox.

In this variety, also, the eruption shows itself earlier than in the other form, usually on the third day, or earlier, instead of the fourth; but in this respect there is no regularity, for it may be retarded until the fifth and sixth day. In general, the pustules do not exhibit the same perfection in maturation, but present a great difference in their appearance from that which is presented in the distinct form.

The color changes about the eighth day to a dusky brown, from the oozing of the fluid desiccating on the surface. These scabs separate about the twenty-first day in large scales, and leave the ulcerated surface beueath exposed to view; these ulcerations, which are seated in the true skin, are the cause of the pits and seams, which mark the faces of those who have passed through a severe attack of small-pox. These are more marked about the face, where the confluence principally takes place.

There is in children almost always a diarrhœa during the height of the disease, sometimes attended with bloody discharges, and always with much prostration.

The fever does not abate on the appearance of the eruption, as is the case when the disease is mild and distinct, but all the symptoms increase in intensity and severity. From the imperfection of the suppuration, the face becomes white or pale as the confluence takes place, and it has the appearance of a continuous elevation of the cuticle, beneath which is a thin serous fluid, instead of the yellow, thick pus, which marks the disease when passing regularly through its stages.

The fever, which is renewed on the appearance of the scabs, and known by the name of secondary fever, is very severe and intractable; the skin becomes dry and hot, the tongue dry, with great thirst. It is usually complicated with severe nervous symptoms, similar to those produced by the shock the nervous system receives from a severe and extensive burn. Violent inflammation also occurs, either in the lungs, pleura, or some part of the abdomen. The eyes also suffer greatly from violent inflammation, which at times extends through all their tissues. Abscesses, petechiæ, and gangrene, occur in various glands and cavities.

Such are the symptoms which small-pox exhibits in its true form, when unaffected by the peculiar conditions of the atmosphere on the constitution of the body, or the effects of the partial immunity which the body receives, from having been affected with a previous attack of this, or of kindred diseases. This subject will be again considered at large, when treating of modified small-pox.

Morbid Anatomy and Pathology.—The pustules of small-pox are found over the whole of the cutaneous surface, but much less in number on the extremities than on the face or trunk. They are also found in the margin of the eyelids, nostrils, mouth, and palatine arch, and at the verge of the various passages to the internal parts of the body. The existence of various pustules in the œsophagus, stomach, intestinal tube, and other internal parts, has been denied by Haller, John Hunter, Tissot, Wrisberg, Riel, and others. Where pustules have been found in the stomach, duodenum, and other mucous surfaces, in fatal cases of this disease, they have been observed to present a different appearance from a genuine variolous pustule of the cutaneous surface, but by Cruveilhier regarded as variolous pustules. In the opinion of the above-mentioned able pathologists, they are enlarged and ulcerated muciparous follicles.

The brain presents but little morbid change, either in its substance or membranes, even in such as have been remarkable for coma, or who have been carried off in convulsions. But little effusion is found in any of the cavities.

According to the dissections of Haller, Wrisberg, Riel, and others, the mucous membranes of the throat, larynx, trachea, and bronchiæ, bear the greatest marks of disease, being remarkably distended with blood in the smallest branches of the blood-vessels ramifying over their surface. In every patient that dies of small-pox the inflammation extends throughout the mucous membrane of the air-passages to the extreme branches of the bronchiæ. Besides these marks of inflammation, there often exist viscid mucus and purulent matter effused over these mucous surfaces, sometimes tinged with blood. Ulceration, and a destruction of portions of the rima glottidis, and the parts adjacent, are also found in severe cases of small-pox.

In violently malignant cases, besides marks of inflammation in the alimentary canal, which are by no means so frequent as in the air-passages, there are found petechiæ and sphacelated spots.

The villous coat is in some places abraded, leaving dark colored eschars, especially in the small intestines. The muciparous glands also are enlarged and indurated, and are intermingled with the petechial spots above mentioned. In young children these alterations are of frequent occurrence, as would be expected from the diarrhœa so common in them. Sometimes the liver is found greatly congested.

The action of the variolous contagion is therefore on the different tissues of the body, but affecting them in different ways. On the skin, it is manifested by the well-known circumscribed inflammation and pustular formations, varying in intensity in proportion to their number. This is also in direct proportion to the violence and extent of the internal inflammation. When the disease is confluent, the mucous membrane of the stomach and air-tubes, but more especially the latter, are very seriously affected with inflammation and ulceration; and death is usually preceded by evidences of a very severe disorder of the pulmonary mucous membrane and lungs.

The mucous membranes, therefore, it is evident, undergo very serious morbid alterations, as well as the skin; the more violently the disease manifests itself by its usual distinctive external signs, the more are the internal membranes disordered; but they exhibit no appearances of pustular inflammation, although evidently affected by the variolous contagion. This is one among numerous other evidences existing, of the physiological connexion between the external covering of the body and the mucous membranes.

TREATMENT.—Notwithstanding the prophylactic measures for the treatment of small-pox within the reach of every one, yet, from ignorance or neglect, or from other causes, small-pox still exists as a serious scourge to portions of the human family, and the physician frequently has to encounter this most loathsome disease. It is therefore his duty to be prepared to meet it, according to the principles which experience has established for its proper management.

From the great dread formerly entertained of the system being exposed to great danger from a tardy or imperfect appearance of the eruption, every effort was made to excite the skin, that the morbific poison might be quickly thrown on the surface of the body. Hence, heating cordials, heated and close apartments, and a quantity of bedclothes with which the patient was kept covered, formed the principal part of the treatment of small-pox. To this course of practice, so assiduously persevered in for a great length of time, must the vast amount of fatal cases be attributed, judging from the demonstrations furnished latterly by the opposite mode of management; for the beneficial effects of the antiphlogistic method have been fully confirmed by experience.

The treatment naturally divides itself into meeting the most prominent symptoms of each stage above mentioned. The first stage, that of incubation, will scarcely be expected to receive any other attention than the adoption of the ordinary rules of hygiene, with the usual antiphlogistic course necessary to prepare the system for the invasion of fever. No certainty can exist as to the reception of the disease; nothing, therefore, can be expected from the physician during this period.

The second stage, or that of febrile development, is an important period for the treatment of this affection. It is difficult to ascertain satisfactorily that the fever is any other than the ordinary inflammatory fever; it may, however, be strongly suspected to be the premonition of variola, when the epidemic is prevailing, and the disease is ushered in with more than ordinary feeling of debility, especially a weariness in the loins. The indication in this stage is clearly to lessen the violence of the febrile excitement; and the measures to be adopted for this purpose must be according to the violence of the excitement, and the circumstances of previous strength or debility of the individual, the condition and mode of life, etc.

There has existed a difference of opinion as to the necessity of blood-letting in the opening stage of this disease; some maintaining that it produces great debility, under which the system is apt to sink, when the extensive suppuration of the pustules takes place. Although the fever is high, and the pulse strong and full, this alone is no reason for resorting to so powerful a measure as blood-letting, in a disease which will pass through its stages under all circumstances, for there is no evidence that blood-letting ever lessens the number of pustules, or in any degree makes their inflammation less violent. For the management, therefore, of the simple precursory fever of small-pox, we must be content to adopt the highest antiphlogistic treatment, without a resort to blood-letting. The bowels should be freely opened, and the patient exposed to the action of cool air; while cool, acidulated drinks ought to be freely given.

The same objection will not exist as to bleeding, when symptoms of local inflammation or congestion of important organs show themselves. Here we must at once resort to bleeding, to arrest the inflammation which we have seen often produces a rapid disorganization of structure. So, also, in the case of convulsions, which are very common in infants, no remedy is so immediately efficacious as bleeding, to the extent of eight or ten ounces, for children between the ages of six and twelve years. If, therefore, we find a child laboring much in respiration, and exhibiting the usual symptoms of a determination of blood to the pulmonary system, a very common occurrence in this disease, or by screaming and shunning the glare of light, with great heat in the head, and a highly flushed face, indicating a great determination of blood to the head, bleeding, either locally or generally, or both, must be our principal resource. It is, therefore, to the actual condition of the system, as well as to the prevailing type of the disease, that we must look to guide us in the use of blood-letting. There is in some individuals so complete a prostration of strength, even with the great heat of the surface, that bleeding would be extremely hazardous, although a local phlogosis actually exists. In such cases there is a great degree of languor, with nausea and vomiting. Here any bleeding would be attended with great danger. Under other circumstances, where there is clearly local disorder prevailing, the general condition of the system will not admit of any other depletion than the cautious abstraction of blood by leeches.

Where there is great nausea, with a foul tongue, and no tenderness of the epigastrium, there has probably been some degree of costiveness during the period of incubation, and the irritation of the accumulated contents of the stomach will need an emetic for their removal. Emetics are only admissible in the earliest period of the disease, when the sickness is produced by the action of the undigested food and viscid secretions. When it arises afterward, and is attended with much pain, especially on pressure, an inflammation of the mucous coat exists, which demands the loss of a little blood; after which fomentations may be applied to the epigastrium.

These are the only circumstances which will warrant the use of any powerful measures in the treatment of the febrile stage of small-pox; but as was before remarked, in the ordinary fever of this disease, a cooling regimen, and a hard mattress and light bed-clothes, with the occasional use of mild aperients, are decidedly the safest measures. As a refrigerant, the nitrate of potass may be used, as it diminishes the strength of the pulse, and increases the secretion of urine. It is much more useful in older children than in infants, from its too powerful action in weakening the vascular action. It has been objected to by Berends in acute exanthemata, from a supposition that its sedative effects on the superficial capillaries, prevent the development of the disease. Henke, however, approves of its use in those cases in which it may be employed in adults; and it has been recommended by other practitioners, to alleviate the violent excitement which precedes the eruption of small-pox. It may be given to children of from one to three years old in the dose of two or three grains, and five or six grains to those from eight to twelve. As adjuncts, the super-tartrate of potash, or the solution of acetate of ammonia may be given, to accomplish the object we have in view. Acids should seldom if ever be given to young infants. Cold water is the best refrigerant that can be used for them, and it may be given frequently with perfect safety to all children. The body may at the same time be sponged with cold water, which will greatly lessen the febrile heat, and it is said will also diminish the number of pustules.

While the refrigerant plan is pursued, care must be taken not to produce a feeling of chilliness, which will greatly depress the vital powers. This is of more importance as the stage of maturation approaches. At this period there is no abatement of the high excitement, and a perseverance in the cold system to an undue extent may be productive of great debility. There ought also to be caution used in the application of cold to the surface, when there is much inflammation of the bronchial or of any part of the pulmonary system. With this course there will be every prospect of greatly lessening the danger in the subsequent stages of the disease.

The opposite course, although not carried to the extent formerly practised, will but make the stage of inflammation and suppuration much more severe and dangerous, and will change the character of the eruption from the simple to the confluent.

During the stage of maturation the same general plan of treatment should be pursued, modified according to the circumstances of the case, unless the symptoms should indicate great prostration, or nervous irritation. It has been the custom to resort at once to tonics and stimulants in this stage. Some mild stimulant may at times be necessary, such as wine whey, where there is great depression of the strength during the suppuration of the pustules, and in cases of great malignity, accompanied with petechiæ and hemorrhage. Small doses of camphor may also be needed under similar circumstances. But the cause of this state is often found in the great state of irritation which the body suffers from the extensive mass of disease. Anodynes, carefully administered, so as to procure sleep when there is much nervous commotion, will often relieve the state of prostration which the patient suffers.

The great relief which children obtain from a copious diarrhœa, in this stage of the disease, naturally suggests the use of aperient medicine, where the bowels are not thus naturally affected. These are especially needed where recourse has been had to anodynes to procure sleep, and to allay the excessive derangement of the nervous system; a course more necessary in children than in adults, from the great and rapid exhaustion of nervous power.

At this period of the disease a severe inflammation is liable to occur about the throat, at times completely preventing deglutition. Inflammation also invades the larynx, trachea, and bronchiæ, accompanied with the usual symptoms of short and laborious breathing, and an appearance of threatening suffocation. Local bleeding is the remedy which promises the quickest relief under these circumstances, from the front part of the neck, over the larynx. If much excitement continue, antimony, or calomel and ipecacuanha[*] may be given every two hours, until the breathing is relieved. This local affection requires a prompt application of remedial measures on its first appearance, to prevent the serious ulceration and disorganization of the part, which we have seen so frequently attend this disease.

The tumefaction of the face is often a painful and distressing affection. The ulceration and closure also of the eyelids may lead to serious consequences. They may be anointed with any soft, simple ointment, or cold cream; and if the eyes are much inflamed, the subjoined wash may be used.* The puncture of the large pustules and blistered surfaces will afford great relief, similar to that obtained by the opening of an ordinary abscess, or the evacuation of the serum from beneath the distended cuticle of an artificial blister. Where the pustules discharge from beneath the scabs a thin, sanious fluid, it may be absorbed by means of finely powdered starch, or flesh powder. The hair should be closely cut; otherwise, in severe confluent cases, it may become a source of great irritation, from becoming matted with the discharge from the suppurated pustules.

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[*] ℞ Pulv. Ipecac.,
Hydr. Subm., ăă. gr. xv.
Sacchar. Alb., ℈ij. M.
Divid. in Pulv. No. xii.
One every two hours.

It is toward the close of the suppurating period that the greatest debility is apt to arise, with cold extremities, petechiæ, and other unfavorable symptoms. In such cases mild tonics may be needed, with diet of a more stimulating and nutritious character than that which is appropriate through other stages of the disease.

There is, especially in children, when affected with inflammation about the fauces and larynx, often a great accumulation of viscid mucus and saliva. This may be removed by syringing the fauces with vinegar and water, or diluted oxymel, or solutions of borax and honey diluted. When the fauces become ulcerated and offensive, diluted tincture of myrrh, or a weak solution of the chloride of soda, will be necessary to relieve this unpleasant symptom. Mild emetics may also be required at this period of the disease, to remove the morbid secretions from the throat and bronchiæ.

The stage of desiccation, or convalescence, needs a mild tonic course, which will be gradually resorted to on the subsidence of the inflammatory symptoms in the third stage. The feebleness and wasting of the body, and the necessity of a restoration to the usual course of living, are the indications of the proper course to be pursued.

The prophylactic treatment consists either in inoculating from a variolous patient, or by the process of vaccine inoculation. The former, however, is entirely superseded by vaccination, which, while it affords an equal chance for escape, also presents the additional advantage of entirely exterminating small-pox; the increase and spread of which, variolous inoculation assists. The subject will be resumed when speaking of vaccinia.

VARIOLOID.

Differences in the appearance and structure of small-pox eruption have long since been noticed; some having a crystalline or lymphatic appearance, others being hardened or corneous, ichorous or emphysematous in their nature. According to these various appearances they have received the names of lymphatic-pox, horn-pox, serous-pox, etc. In such, also, as have at the commencement the true characters of the inflamed elevation of small-pox, an imperfect formation of pus takes place, the suppurative process stops, and the pustule shrinks.

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* ℞ Plumbi Acetat., gr. v.
Aquæ, ℥iv. M.

These differences have been observed to occur in epidemics, the development being modified by the action of the cause of the disease; various grades and forms being occasionally thus produced.

But the most common cause of the difference in the eruption of small-pox, is the influence the constitution of the individual has upon it; for every variety which has been noticed will occur during the prevalence of the disease in the same place. Some will escape altogether; no susceptibility existing from hereditary or individual peculiarities. Others, when passing through the disease, exhibit the ordinary symptoms, variously modified from the same cause. The previous ill-health of the patient will control in some degree the character of the eruption; and in some unknown states of the system the progress of the eruption is checked.

The usual source of partial immunity is the previous attack of the disease, or the prophylactic measures adopted, whereby the patient has been subject to the influence of the same, or of a kindred affection. It has been long known that persons who have had the small-pox, either naturally or artificially produced, were sometimes attacked with the disease a second time, and occasionally in a very severe form. It has also been remarked, that the secondary disease rarely exhibited the strongly-marked characters of the first, and presented likewise the characters of the spurious form. Whenever small-pox attacks a second time, it usually exhibits the appearances of the crystalline variety.

At the time when vaccination was introduced, little attention was bestowed on the fact, that small-pox would affect a person a second time; and it appears to have been overlooked, or, at least, regarded as a circumstance of exceedingly rare occurrence. But the numerous examples of varioloid eruptions occurring after vaccination, which process had afforded so many proofs of the protecting power of the disease thus communicated, led to a more close and critical examination of the nature and character of these eruptions. The result of these investigations is, that a modified disease will occur at times, both after small-pox naturally taken or artificially induced, and also subsequently to the process of vaccination. Vaccination is not a perfect security from an attack of small-pox; but instances occur where, on an exposure to variolous contagion, a disease having a close resemblance to variola, but generally void of danger, will sometimes attack the vaccinated individual. This varioloid disease occurs more frequently where the genuine variola is most severe and fatal; showing that the augmented malignancy of the variolous contagion is, in general, the cause of the defective protecting power of vaccination, and producing in some a modified small-pox, but with symptoms sufficiently approximating to that disease, to render them identical.

Although a previous attack of small-pox, either natural or inoculated, produces some modification in the second, yet there is no agent so powerful in modifying small-pox as vaccination; for the characters of the disease are much more changed in such as have undergone this process, than in those who have passed through the former. This modified disease, or varioloid, is that which I shall now consider. The causes of these modifications, if they have their origin in anything that affects the proper development of vaccine, will more properly be the subject for consideration under the head of vaccination. The different conditions of susceptibility to small-pox, and the effects of severe variolous contagion, have already been alluded to. The influence of this agent in producing varioloid after vaccination, is of much more frequent occurrence than a second attack of small-pox. This subject will also be referred to in another place.

The identity of the small-pox with the modified disease occurring after vaccination, has been questioned by some, but no doubt, I think, can exist that the disease is the same, having undergone an alteration, from the partial immunity secured by the individual by the influence of vaccination. During the prevalence of small-pox, the appearance of the varioloid eruption, it is observed, will occur in many vaccinated individuals, evidently proving it to depend on the variolous epidemic. The contagion, also, in a family where there are some who have been protected by vaccination, and others who have not been thus protected, has been traced from one to the other, either appearing as the variolous or varioloid disease, depending on the condition of the patient, and communicating either one or the other, according to the protected or unprotected state of the individual first attacked.* The facts connected with the appearance of varioloid in the United States, correspond remarkably with those which existed in London forty years since. Varioloid has also been produced by inoculating those who had been previously vaccinated with the matter of variola. Numerous evidences of the variolous origin of the disease, known by the name of modified small-pox, are found in the elaborate work of Dr. Thompson, of Edinburgh.†

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* V. History of the Natural and Modified Small-Pox, etc., by John K. Mitchell, M. D., and John Bell, M. D., N. A. Med. and Surg. Journ., vol. ii., p. 244.

† On the Varioloid Epidemic; Edinburgh, 1820.

Varioloid is characterized by the comparative mildness, and generally by the short duration of the precursory fever, and the occurrence of a perfect suppuration in the eruption.

The fever is often so mild as to attract but little attention. In a few instances, however, it is severe, but not of long duration; and like the milder form of variola, it disappears on the commencement of the eruptive stage. The febrile stage is also irregular as to its period, varying from two to five days; at the end of which time a slight redness, of an erythematic character, shows itself, particularly on the face. The minute spots of varioloid then appear, gradually assuming the form of small papular eruption. In general these dry away in the course of five or six days, leaving an indurated spot; a few, however, having a pustular, and others a vesicular appearance. The eruption is various as regards the number; in some instances there are but a few scattered in different parts of the body, and in others they cover closely the face, trunk and limbs.

The common or indurated spots are quickly dried up; those which suppurate become umbilicated; a dry scab forms on the fourth day, and usually falls off about the eighth. The vesicles bear some resemblance to the vaccine inoculated pock; and from their rapid progress, and crystalline or watery appearance, have been regarded as identical with varicella.

There is rarely if ever any fever during the eruptive stage, and the desiccation generally commences on the fifth or sixth day. On the separation of the scabs, discolored spots, or slight elevations, are left, having the appearance of warts; rarely are there any pits formed by the pustules of varioloid.

It is difficult, when the disease is severe, to distinguish it from small-pox, the fever being equally violent, and the eruption as abundant. It may, however, be distinguished by the small size and papular or tuberculated character of the pustules, the lighter color of their contents, the irregularity with which they appear, coming more in successive clusters than simultaneously, as is the case in genuine variola. Many observers have remarked an areola around the varioloid pustule, resembling that which surrounds the vaccine vesicle, giving it an appearance of both diseases. This has also been noticed when an individual has passed through both affections at the same time. The desiccation also takes place at a much earlier period than in variola, and the scabs separate about the eighth or ninth day.

As regards the treatment of this affection, if differs in no respect from that of variola, and in most instances scarcely requires any treatment. Where the febrile action is high, a little blood may be drawn and a purgative administered. Diaphoretics, also, are useful during the existence of fever.

VARICELLA.—CHICKEN-POX.

Another form of modified small-pox is an eruptive affection, the characters of which are well indicated by its name, varicella, given to it by Reverius, who wrote on this subject about the middle of the seventeenth century. The terms crystalline, lymphatic, spurious small-pox, also point out its nature with considerable accuracy. Long before this period, descriptions were given of spurious eruptions, having something of the appearance of variola, but which imparted no protecting influence against a second attack of that disease. Sydenham has also given an account of an imperfect form of small-pox, which gives no security against the variolous contagion. Morton also described the same disease, but adopted the popular name of chicken-pox; and all writers speak of the occurrence of a spurious small-pox, corresponding with the accounts of these authors.

Etiology.—There have been differences of opinion with regard to the origin of this disease, but all unite in the fact of the occurrence of imperfect or spurious cases, destitute of the protecting property either of variola or vaccinia. Those who have contended for the distinct origin of varicella, have not satisfactorily established the fact of its being independent of variola, and differ from each other in relation to their pathological inferences.

Dr. Heberden was the first who attempted to establish distinctly the fact of the difference between small-pox and chicken-pox, referring it to the action of a distinct contagious principle. His paper was published in the year 1767.* Cullen, also, adopted similar views.† Others, on the continent of Europe, Sauvages and Burserius, regard it as a modification or variety of small-pox. Subsequent investigations have satisfactorily demonstrated that it owes its origin to the influence of variolous contagion, equally with the various appearances of small-pox, described by the older writers. This opinion is adopted by Dr. Thompson, after a very laborious and close investigation into the causes and nature of variolous diseases, as they occurred in Scotland. The same views are held by others.

Wherever the small-pox has prevailed, there has been, as before remarked, a variety in its appearance in different subjects. In some there is a light and crystalline eruption, that is so modified, either by the temporary condition of the individual, or by some mildness in the variolous contagion, by which an epidemic will be at times characterized, that it passes but imperfectly through its course, never passing beyond the vesicular condition which marks the first minute appearance of the pustule in small-pox, while the other concomitant symptoms exhibit a similar mildness and imperfection in their development. These are essentially different from another appearance which small-pox assumes, when modified by vaccinia; in this spurious disease, the pustule assumes the marks which characterize both diseases, but is essentially pustular in its nature, with the central depression which marks small-pox. From this circumstance, it has received the names of varioloid and pustular varicella, while the still more imperfect, or crystalline variety, has been called vesicular varicella.

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* Transact. of the Royal Col. of Physicians; Lond., vol. i., p. 427.

† Synop., vol. ii., p. 134.

The fact has been questioned of the variolous origin of the chicken-pox; but, after the abundant proof furnished by Dr. Thompson and others, of its connexion with variola, there can scarcely exist a doubt on the subject. A condensed summary of the objection, and the arguments in favor of this opinion, may be found in Eberle's Treatise on Children.*

Whatever views may be adopted, it is of little practical importance whether the disease originates from specific contagion, or in common with variola, compared with its proper description and diagnosis, as it affords no protection against a second attack of small-pox. It is therefore of some importance to be able accurately to distinguish chicken-pox from its kindred affections.

Like other forms of varioloid affections, chicken-pox is preceded by febrile symptoms, of a slight character, and often on this account unnoticed. Its continuance is from twelve to forty-eight hours; rarely longer than this. The child is a little languid, and complains of a slight head-ache; seldom, however, are the symptoms sufficient to interfere with the usual occupations of the child. Although this is the type of the precursory fever, it is not thus uniformly mild; but symptoms similar to those preceding small-pox have at times been noticed.

The eruption on the first day of its appearance is marked by small red spots, superficial, sometimes of an oblong, and at other times of a circular form. In other instances, as these run into each other, their margins become irregular, when they have no definite shape. On the second day of the eruption, a vesicle is formed, containing a transparent, light straw-colored fluid; it is broad at its base, and becomes accuminated at the top. Other spots and vesicles sometimes arise, the bases of the vesicles being usually much inflamed. On the following day the contents of the eruption becomes of a deeper yellow. On the fifth day a minute scab is formed in the centre of the vesicle, giving it something of the depressed appearance of a small-pox pustule. This form does not occur in all; some are thus *umbilicated*, others are *conoidal*, and some *globose;* the latter has also received the name of *swine-pox.* On the sixth day a small scab occupies the place of the vesicle, which falls off on the seventh or eighth day.

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* Page 419.

It is attended with severe itching, especially in children, and the eruption being thus often broken, the characters are very soon effaced.

The disease is occasionally confluent; the general symptoms are then much more severe.

The diagnosis of the disease may be made by attending to the following pathognomonic symptoms.

Varicella has a peculiar odor, decidedly different from the marked fetor of variola. The eruption of chicken-pox, unlike that of small-pox, appears over every part of the body, commencing on the trunk. It is well known that in the last-mentioned disease the eruption commences on the head and neck. In chicken-pox the eruption is usually completed in twenty-four hours, some vesicles appearing irregularly afterward. The small-pox, however, does not show itself until the third or fourth day, and proceeds regularly on its course. The vesicles of chicken-pox are filled with a whitish lymph, and never with thick, purulent matter; they become shrivelled on the fifth or sixth day, but do not exhibit the incrustation of small-pox. In some instances they have the appearance of the depression observed on the pustules of small-pox, but close examination will detect the difference. The whole aspect of the varicellous eruption is much more pointed than in the other disease.

It is so mild a disease as scarcely ever to require any treatment. If, however, it should become severe, the same principles which are adopted in small-pox are applicable to chicken-pox.

VACCINIA.—COW-POX.

The disease now to be considered has become one of the most important which has at any time occupied the attention of the physician. As a prophylactic remedy for another affection of a very fatal character, it has been regarded as the greatest boon to mankind in the healing art—the only means left for the effectual prevention of that loathsome scourge, which seemed almost to threaten with extermination the entire population, wherever it commenced its fatal ravages; and which, on our own continent, in those remote parts where science has not interposed her protecting hand, has in truth swept whole tribes of the human race from the earth. The benefits, however, which at first were thought to be complete, and the protection universal, have, in some instances, been found to be partial; and doubt and distrust have been allowed, in the minds of a few, to take the place of the unlimited confidence hitherto so fully bestowed on the powers of the vaccine disease. Its importance, therefore, increases with the number of failures, either partial or complete, in its protecting power, and with the necessity which now exists for a close and impartial investigation into the causes which have thus produced uncertainty in the results.

Before considering the artificial introduction of the disease into the system for protection against the contagion of variola, it will be proper to take a brief view of the disease, and the characters it exhibits in its natural state.

As the name imports, it is a disease affecting the cow; and it has been supposed that this vesicular disease has been long known as peculiar to that animal, and has been transmitted to man. Pliny mentions in several places a papular disease by the name of *Boa*, which M. Phela, physician to the Pope, in a work published at Milan, in 1825, considers as a name designating its origin from the cow. Having never seen his work, nor any other notice than one containing the simple statement above mentioned, I am unable to present any of his views in relation to the fact, or of his hypothesis founded on it, of the identity of the two diseases, and that small-pox is originally derived from the cow, and becomes altered by the influence of the human constitution.*

The identity, however, of these two diseases, modified by constitutional peculiarities, has been more recently proved by well-conducted experiments, in transferring variolous matter to the cow, and thus causing the vaccine infection. It was Jenner's opinion that the two affections were one and the same; he therefore gave the name of variolæ vaccinæ to the vaccine disease, which he regarded as only changed by passing through the system of the cow. It is certain that an epizootic disease, having the characteristics of small-pox, has often prevailed in various districts of country, and at the time Jenner announced his discovery, had previously existed; the disease, as noticed by Jenner, being but the remains of this epizootic malady.

Dr. Sonderland, of Bremen, was the first who performed the experiment of infecting the cow from variola. His account was published in the German periodicals, in 1831. He took the woollen bed-clothes, which had been on the bed of a small-pox patient, who had died with the disease in its most aggravated form, and fastened them to the backs of cows. They became in a few days sick and hot, while a pustular eruption appeared on the skin, especially on the udders, having all the appearance of vaccinia, and capable of producing the ordinary vaccine vesicle. Several attempts have been made to repeat these experiments, but they have in every instance been unsuccessful in producing a perfect disease. In some instances an eruption of a pustular character showed itself in the parts immediately in contact with the infected clothes. No proper vaccine vesicle, however, resulted from the use of lymph taken from these pustules, with which several children were inoculated.

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* The following passages are found in Pliny: *Boa* appellatur morbus papulorum cum rubentes corpora * * * Lib. xxiii., Cap. viii. * * * *boam* sanant, id est rubentes papulas. Lib. xxvi., Cap. xi. If the name of the disease be derived from Βους, a cow, or an ox, there may be some foundation for the fact above stated.

The failures probably arose from some atmospheric or other peculiarity, for it is not under every circumstance that the cows are susceptible of the disease. The soil, and some other unknown influence of the situation in which they are kept, have been supposed to exercise a control on the development of the disease in them. Cows that are kept closely pent up are much more liable to the disease than others. Change of food, season of the year, and the age of the animals, also, have been found to exert a material effect on the appearance of the disease among them. The difficulty, therefore, of conducting a set of well-arranged experiments, from which similar results are to be obtained, is obvious; and even in the more direct communication of the variolous infection to the cow by inoculation, numerous failures may reasonably be anticipated, but can have no weight as evidence, when well-authenticated instances of an opposite nature exist, even though small in number.

The British and Foreign Medical Review* contains a very able digest of the amount of information existing on the identity of the small-pox and cow-pox, in which the reviewer has summed up the experiments that have been made to prove this identity. Experiments have been instituted in different countries; in Russia and Great Britain with a similar result. Dr. Basil Thiele, of Kasan, in South Russia, and Mr. Ceely, of Aylesbury, in England, both had recourse to the inoculation of cows with variolous matter taken from the human subject, to test this question.

Dr. Thiele at first tried without success the method of Dr. Sonderland. He then, in 1836, inoculated a cow with variolous matter, and from the disease thus produced, succeeded in giving the vaccine disease to several children, the vesicle having all the characters of the genuine vaccine, but attended with more severe constitutional symptoms than is usual. During the period of two years following, upward of three thousand persons were vaccinated with the virus that had originally come from the animals inoculated by him. Great care was taken in selecting cows with fresh milk, and between the ages of four and six years. He carefully kept them in a temperature of 66° Fahrenheit, and had them regularly fed and milked. With these precautions, and the insertion of the virus in the posterior part of the udder, where the cow could not lick it, he succeeded in producing the genuine vaccine disease.

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* No. xvii., for January, 1840.

The other set of experiments, equally satisfactory, were made by Mr. Ceely, in Aylesbury, in England, and are detailed in the Report of the Seventh Anniversary Meeting of the Provincial Medical Association, held at Liverpool, in July, 1839, on the present state of vaccination.

Mr. Ceely, after a number of unsuccessful attempts to affect cows with variolous matter, applied in the manner previously done by Dr. Sonderland, by investing them with the blankets from the bed of a small-pox patient, and also by the insertion of the virus, succeeded finally in inoculating, with variolous matter, three young heifers, by means of punctures made in the labia pudendi. Another animal was vaccinated in the same manner.

One of these cases affords a sufficient illustration of the process he pursued to determine the question. Variolous matter of the seventh or eighth day was inserted into the left labium pudendi, by means of seven punctures. Nine days after, the same animal was vaccinated on the right labium pudendi, with lymph taken from a child, with the same number of punctures; and below the same labium with four punctures. On the tenth day after the insertion of the variolous matter, one of the punctures on the left labium pudendi had assumed the form of the vaccine vesicle. From this vesicle he charged several points with lymph; and on the fifth day of the insertion of the vaccine virus the eleven punctures had become perfect vesicles; he charged a number of points with clear lymph, and used it on adults and children. The vesicles on the two labia were the same; and on the twenty-sixth day of the variolous, and the seventeenth day of the vaccine inoculation, the appearance of the scars were similar. The experiments were afterward varied, and the animal subsequently inoculated both with variolous and vaccine matter, without any result following. The vesicles corresponded in every respect with those delineated by Jenner. No doubt can now exist of the identity of the two diseases, but varying under the circumstances arising from the peculiarities in the constitution of the animal.

As to the origin of the disease, much greater difficulties exist than in proving its identity. By some it is believed to be the variolous disease modified by passing through the cow. Others have thought, as was remarked above, that the original disease existed in the cow, from the name by which a similar disease, supposed to be the small-pox, was designated in former times, and that it became modified into the variolous disease by the influence of the human constitution. Experience, however, appears to prove the reverse of this, and the name gives no further proof of its true origin than vaccinia does at the present day. Others ascribe the formation of the vaccine vesicle to the matter from the heels of the horse, affected with a disease, and supposed to be the same as is known as the grease, javart or eaux aux jambes, of the French.

This affection, it would appear, exists, variously modified, in several animals; for numerous facts go to prove that, according to the laws of immunity observed in the variolous disease, no second attack is likely to occur when either men or quadrupeds have passed through a disease bearing the general marks of variola, from what source soever it may be derived. Thus, the same exemption exists among those who attend flocks of sheep, and have taken from them a mild, eruptive disease, according to the information obtained from the native tribes in India, by Mr. Bruce, consul at Bushire;* as is found to be the case with those who have had the matter of the grease, or the contents of a vaccine vesicle from the cow, casually transferred to them. It has also been asserted that sheep will be protected from this eruption by inoculation with variolous matter.† These facts show that these epidemic and epizootic diseases are derived from one source.

It is certainly very difficult to trace to its origin a disease which assumes such difference in its appearance, and which is equally communicable from one animal to another. Cows, sheep, and horses, all have a disease, which, although at times apparently occurring without being traceable to any distinct source, yet may also be transmitted from any one, but presenting shades of difference, by which each can be distinguished from the other; while in man a similar one arises, marked, as its distinctive characters, by its violence, loathsomeness, and extreme fatality. The latter disease, as has been seen by actual experiments, will develop the former; but the epizootic malady will only produce its like in the human system. Does not this fact appear to sustain the idea, that the vaccine disease, and its kindred affections, are offsets and modifications of the variolous disease—a sort of abortion or imperfect development of the most violent form which it uniformly assumes in man? Such changes appear to be the course generally observed throughout the other departments of nature, and diseases exist in their most perfect form of virulence in man. When occurring in quadrupeds, they appear as much milder affections, and are rarely, if ever, fatal; as is seen during pestilences, affecting both man and beast. If, therefore, its origin is to be sought by tracing its communication, it seems more natural to refer it to the disease as it affects man, where it is uniformly more severe and fatal, and in whom it consequently must be regarded as most perfect in its development.

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* Mediz. Chirur.; Zeit., 1809.

† Extract of a Letter to W. Erskine, Esq., Trans. of the Soc. of Bombay.

In the cow, vaccinia appears as an inflammatory disease of the udder, which is communicable by contact; for it has been observed to spread throughout a herd very soon after one cow is affected. It shows itself, at first, in the form of small, red elevated points beneath the skin; these afterward become of a bluish white, and contain a fluid, at first thin, limpid, and white. Some exhibit a pearl color, or a whitish yellow; afterward, opaque and purulent. These eruptions appear both on the teats and udders; but Jenner considers the teats as the only part where the genuine disease is seated. He also regards the disease which occurs on the udders, having a resemblance to cow-pox, as not the genuine affection, it being often induced by the practice of the dealers, when, bringing their cows for sale, abstaining from milking them, that an undue distension may take place.

The vesicles differ in number, but they have sometimes amounted to twenty or thirty, about the size of a pea; in other instances they are as large as a hazlenut. They are usually circular, with a central depression; the latter, however, is not uniformly well marked, and is at times entirely absent. The structure of a true vaccine vesicle is cellular, and has been compared to the pulp of a lemon; on this account it does not readily discharge its contents on being opened or ruptured. The spurious pock, on the contrary, is easily lacerated, and the whole fluid contents flow out at once. The color, also, is some indication of the genuineness and purity of the lymph. The bluish, pearly, yellowish, or purulent pock, is not to be depended on for producing the proper protecting vesicle. An areola, distinct and circumscribed, of an erythematic inflammation, surrounds the pock, and is another evidence of its genuineness. Such as are destitute of this, or where it is remarkably pale, or where, in its place, there is a hardened state of the surrounding parts, with deep-seated inflammation of the cellular tissue, but little reliance, according to the experience of Jenner and others, ought to be placed on it, for yielding the proper lymph.

Where cows have been vaccinated, the first appearance of the disease is on the sixth day; when taken accidentaly, it is said to be on the third or fourth day, and the vesicles attain their maturity on the eighth, ninth, or tenth day, when a scab commences in the centre of the pock.

The constitutional symptoms are sometimes severe, and at other times entirely absent. It has been attempted, from the existence or absence of loss of appetite, fever, secretion of milk, etc., to make a diagnosis between the genuine and spurious disease; but these constitutional derangements have been found to exist in the genuine and spurious diseases, and can not be regarded as of any account. Jenner, Dr. Herring and others, do not consider constitutional disturbance as essential to the existence of genuine cow-pox.

This affection is sometimes contracted casually by those engaged in milking, when it affects principally the ends of the fingers. This is usually a much more severe disease than that artificially induced, from the great number of vesicles produced, and the fever, rigors, and swelling of the axillary glands.

VACCINATION.

The protecting powers of the vaccine disease appear to have been perfectly well known to the nomadic tribes in Hindostan and the Chinese, according to the statement of Mr. Bruce* and the researches of M. Moreau de Jonès.† But this fact does not in the least detract from the admirable discovery of Jenner, in 1796,‡ who in Berkley, near Gloucester, where the disease was found to prevail extensively among the cows, first conceived the idea of applying it for the prevention of small-pox, from having observed that the dairy maids, and such as had contracted the disease accidentally from the cow, were thereby protected from the infection of small-pox.

After having, in the month of May, vaccinated a boy from the ulceration on the hand of a dairy maid, he tested the patient, by variolous matter taken from the pustule two months afterward. The experiment was again repeated, but without any sensible effect on the constitution. During the period of two years several similar experiments were tried with the like result, when his discovery was publicly made known.

In the year 1797 some vaccine virus was forwarded to Dr. David Hosack, by George Pearson of London, but it was not until the year 1799 that the discovery was announced in the United States in the Medical Repository, published in the city of New York. In July, of the following year, vaccination was first successfully practised by Dr. Benjamin Waterhouse, Professor of Medicine in the University at Cambridge, Mass., on four of his own children. Dr. Valentine Seaman was conspicuously active in introducing the practice into the city of New York; the virus he obtained from

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* Epist. Cit.

† Archiv. Gén. de Méd., t. xiii.

‡ Inquiry into the Causes and Effects of Variolæ Vaccinæ; London, 1798.

Dr. Waterhouse, and with which he vaccinated his own son and a number of citizens.

The proper age for vaccinating a child is from the second to the fourth month, the period when the body is sufficiently developed to receive and mature the disease, and before the irritation of the system from teething has occurred. Children have been vaccinated before the period above-mentioned, even within the week; but the sanguineous congestion of the skin, and the great tendency to inflammation from this cause, on the slightest irritation, may be productive of an erysipelatous affection, or excite a chronic inflammation, which are often very tedious and unmanageable when once formed. After the second month the vaccine disease appears to proceed with more uniform regularity, and is attended with less febrile irritation than at an earlier period. Should the small-pox prevail, we should not wait however, but it may, under such circumstances, be performed within the month. The season of the year is also of some importance to the success of vaccination. The heat of summer is unfavorable to the proper performance of this operation, and it more often fails during this season than any other; the free secretions from the skin removing the virus when inserted. The tendency, also, to inflammatory eruptions in hot weather, renders the operation liable to excite the skin to inflammation. Extreme cold, also, acts unfavorably on the proper success and full development of the vaccine vesicle. It ought, therefore, to be performed, if possible, in mild weather. The spring, and commencement of summer and autumn, are the best seasons for vaccinating.

The proper virus is that which is taken on the eighth day of the disease, before the areola has showed itself. It sometimes happens that the incubation is protracted, and the vesicle is not so much advanced on that day as is necessary to obtain virus which will secure the formation of a proper vaccine vesicle; this often happens without the disease being affected. The taking of the matter may, under these circumstances, be delayed until the vesicle is filled.

It is sometimes deemed advisable to preserve the vaccine virus in a dried state. The usual method of doing this is to receive it on the convex surface of the extremity of a piece of quill, or on the small ivory teeth of a comb, when it is to be preserved but a short time. The part to be charged with the virus should be slightly roughened by scraping it; a greater quantity will in this way be made to adhere. It may also be preserved by receiving it on the surface of a square piece of flat glass; another piece, of the same size and shape, is then applied to the surface containing the virus; and both secured by coating the edges with wax, and wrapping them in dark colored paper, to exclude both air and light. Dr.

Jenner's plan was to receive it in a cup-like cavity, formed on the surface of a perfectly smooth plate of crystal or glass; over this was applied another smooth piece with an even surface, by which means the virus is preserved fluid, the edges being closely luted.

Another method is by means of small, delicate tubes, drawn out in capillary points. These are charged by applying the smallest extremely horizontally to the drop of lymph, which passes into the tube by capillary attraction. This is repeated until the tube is filled, when it is hermetically sealed by fusing it in the flame of a lamp. Tubes thus charged may be enclosed in the barrel of a quill, and virus used even after the lapse of some years.

Scabs may also be used, for the virus can in this way be preserved for several months; it ought to be taken from vesicles that have not been broken. A proper scab should be circular, of a mahogany color, and hard in its texture.

The following are the characteristics of good vaccine virus. It issues slowly from the vesicle, owing to the cellular structure, and assumes a spherical shape. It is adhesive, and imparts the sensation of syrup when taken between the fingers. It dries rapidly on whatever it is received, having the appearance of dried gum arabic. When covering the surrounding skin, especially if the latter be red, it has a bright silvery lustre. It mixes with difficulty with blood; and when a piece of quill is stained with it, on which there is accidentally a little blood from the puncture, it does not color equally every part that has received the virus.

When the scab is used it should be cut, and a small quantity scraped from the smooth surface; this ought to be mixed wtth cold water, and the paste thus formed may be used for vaccination. The virus of the scab may also be preserved by pulverizing it, and forming it into a paste with water, which may be placed between two pieces of square glass and tightly secured; to be moistened when it is to be inserted.

The different methods that have been adopted for inserting the vaccine virus are, by friction, vesication, puncture, and scarification.

The first-mentioned process is now altogether abandoned, from its uncertainty and extreme pain; it is performed by means of a piece of rag passed briskly over the surface, until the cuticle is excoriated. A small blister has also been much in use; but the pain and soreness, and the length of time required, make this method also objectionable.

When the method by puncture is adopted, it is best performed by a sharp lancet introduced beneath the cuticle, so as to elevate a considerable portion. Under this, the recent virus may be introduced from the blade of the lancet, or that which has been preserved on a sharp point of a piece of a quill may be applied, by introducing it, and keeping it for some time in its place by pressure with the thumb or finger. When it has been held a sufficient time to allow of the solution of the virus, it may be withdrawn while the pressure is still continued, that it may be completely wiped off.

Another method, and that most commonly in use in the United States, is by scarification. About half a dozen parallel scratches are made, about a line in length; these are crossed by others, and when the blood has ceased to ooze from them, but before they become perfectly dry, the virus is applied by gently rubbing them with the lancet, or whatever else is charged, until it is wholly wiped off by the serum that moistens the scratches. It should then be permitted to dry on the part, and great care observed that it be not rubbed or washed during the period of incubation, which will interrupt the proper development of the vesicle. Pieces of the barrel of a quill, used to vaccinate according to this method, are much broader than those employed for insertion in a puncture; when thus used, they are sharpened at the point.

The spot usually selected as being the most free from the danger of friction, is in the arm, near the insertion of the deltoid muscle.

The number of punctures does not appear to be of as much importance to the full effect of the vaccine virus as has been thought by some, if we may judge from the extensive immunity from small-pox enjoyed in this country, where it is customary to have but one vaccine vesicle. The better, however, to ensure the success of the virus, two or three points of insertion may be made. This method may also be resorted to, if it is intended to take virus from the child. In France, it is recommended by M. Husson to have three punctures made on each arm, and in some parts of Germany and Prussia as many as twenty-four; but instances of severe inflammation and sloughing have occurred where several punctures have been made.

The first appearance of a successful vaccination shows itself about the commencement of the third day, in the form of a minute spot of inflammation. On the fourth, it has the shape of a small conical tumor or pimple, which is attended with itching. On the fifth day it enlarges, and is surrounded with a narrow, bright red belt, while the pimple has assumed the appearance of a vesicle. A depression about this time appears in the centre, of a fawn color, which is much more strongly marked on the seventh day; its margin is white, and distended with lymph. On the ninth day, the vesicle arrives at its perfect state, when it is fully distended, with the central depression in the form of a large brown scab.

At this period the constitutional disturbance, which takes place to a greater or less degree, in most cases shows itself. This may appear simply in the form of a slight restlessness. At other times there are chilliness and fever, with tumefaction of the axillary glands. About the tenth day the rim containing the lymph loses its brilliancy, and becomes flatter, while the surrounding inflammation is much increased, and is attended with great swelling and hardness, and often with heat and pain. On the eleventh day the vesicle is more flatteneed, and its contents are more yellowish, while the central depression extends and becomes darker, or of a mahogany color. From the twelfth to the fifteenth day the vesicle is quite flat, and the desiccation increases toward the circumference; the inflammatory circle at the same time diminishes, and becomes much paler. The scab loosens at the circumference, but remains attached at the centre, until the twenty-first to the twenty-fifth day, when it detaches itself and falls off. The scar remains for a time red; afterward it assumes a brownish hue, but ultimately an indelible white depression, with minute remains of the cellular structure of the vesicle.

Much reliance has been placed on the peculiar appearance of the cicatrization, as an indication of the vesicle having been of the right protecting quality; but this has not been found to be so sure an indication that the system is unsusceptible to small-pox; for it has been ascertained that genuine vaccinia will sometimes leave an imperfect scar, or even no cicatrix whatever. This circumstance will be again referred to when the subject of revaccination is considered.

It was the opinion of Jenner, and is now the opinion of practitioners generally, that some degree of sympathetic fever is necessary for the perfect success of vaccination, as giving undoubted evidence that the constitution is affected; although where this is absent, and the local disease has passed regularly through its stages, a complete immunity has existed. But the necessity for causing a development of fever, by increasing the punctures, as has been the practice in some parts of Germany, even to the number of thirty, is altogether unnecessary, if not positively injurious; for experience has shown that the fever, restlessness, and fretfulness of the children, are greatly increased, even during the period of incubation; and this concomitant affection will materially interfere with the proper development of the vaccine vesicle, from the morbid excitement arising from simple irritation of the inflamed punctures.

Sometimes the period of incubation is protracted for a week or ten days, when the vesicle makes its appearance and passes through its stages, affording as perfect a protection as if it had appeared at the usual time. A remarkable case of a protracted vaccination is mentioned in the Journal Universel, for July, 1829, as having occurred in a child of three years of age. Four punctures were made, from which no effect resulted until two months afterward, when two genuine vaccine vesicles were developed, from which other children were successively vaccinated.* This deviation is more likely to occur in winter, or where, from peculiarity of constitution, there exists a deficiency in the normal action of the skin.

There are imperfect or spurious results from the insertion of the virus, which may arise from various causes; such as virus taken at too late a period, alteration occurring in it from partial decomposition from the rust of the lancet, or some peculiarity or disease of the individual vaccinated.

These varieties are in some instances difficult to distinguish from the true vesicle of cow-pox; but the diagnosis is necessary, as protection can not be afforded by them. Dr. Willan has given a very accurate description of them, and has divided them into three varieties.†

X Spurious vesicles,
[illegible]

X The first he describes as a pearl-colored vesicle, with a slightly elevated dark red base. It is smaller than the genuine vesicle, of a globular form, flattened at the top, or a little depressed; the margin is neither rounded nor prominent. The second is the angular-edged vesicle, but in other respects bears a close resemblance to the true vaccine eruption. The most common mark of distinction is the areola, which in both these forms is less defined and more diffuse, of a radiated and scarlet color in the second. It appears also much earlier than in the genuine disease, from the fifth to the eighth day after the insertion of the virus, and continues for three days. The scab is completely formed at the end of this period, and soon falls off, leaving but a slightly marked cicatrix. The other is where the areola is entirely absent.

It may be often difficult to make a close and satisfactory diagnosis, in some instances, of spurious vesicles of the vaccine disease; but in every instance of doubt it is best to repeat the operation.

As to inflammations, ulcerations, abscesses, and chronic affections of the skin, or whatever accidental occurrence may arise from the irritating wound, it is unnecessary to make any remark, as they can not possibly be confounded with the genuine vaccine pock.

It was formerly the custom, when there was any doubt in the efficacy of the vaccination, to resort to the inoculation of the patient with variolous matter; but this is unnecessary, and, indeed, difficult at this time to perform, when there are so few cases of small-pox. Revaccination will in general furnish proof sufficient of the condition of the system; for if the first insertion has been successful, the second will be followed only by an erysipelatous inflammation, or by an imperfect vesicle. Cases, however, have occurred, where the vaccine disease has been developed a second time after a full and satisfactory vaccination. Its success, therefore, is not always a sufficient evidence of the imperfection of the first.

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* American Journal of the Medical Sciences, vol. vi., p. 164.

† On Vaccine Inoculation, by Robert Willan, M. D., F. R. S.; London, 1806.

Mr. Bryce* has proposed a test of the constitutional affection, by revaccinating during the progress of the vesicle, before the constitutional symptoms, which he regards as occurring on the appearance of the areola, have taken place. The method is to insert the virus a second time, about the end of the fifth, or beginning of the sixth day after the first; that is, from thirty-six to forty-eight hours before the appearance of the areola. The affection produced by the second vaccination will be accelerated in its progress, arrive at maturity, and fade away at the same time as that arising from the the first vaccination. If, on the contrary, the original vaccination have failed in producing the specific constitutional disorder, the second will observe a complete regular course, instead of accompanying the first, which it does from the fifth day, when the operation is successful. From this period of the second, corresponding to the tenth day of the first vaccination, they both proceed to their termination, which is usually on the thirteenth day.

The experience of upward of forty years, accumulated from every part of the world, has fully proved the triumph of vaccination over the dreaded contagion of variola. The success of vaccination, which, from the time of Jenner, has steadily overcome all the obstacles which prejudice or ignorance had brought against it, has, however, within a few years been questioned; and the recurrence of the small-pox, in some of those who were believed to have been guarded against its attack, has given rise to the idea, that a false security had been indulged, in supposing they enjoyed an immunity from an attack of that disease. Far from drawing such an inference, from the prevalence of varioloid affections among those who had been subjected to the prophylactic measures of the immortal Jenner, a little examination into the true facts that experience has revealed to us, will enable us to exhibit the subject in its proper light, and to show that several causes may exist to prevent the proper development of the protecting disease in the system, and that far too much was at first expected from the influence of vaccination by some of its early friends. While Jenner was cautious in his deductions, from observing that small-pox itself, in its most violent form, could not, in every instance, protect the individual from a second attack, his less judicious followers boldly asserted that vaccination would, in every instance, afford a perfect protection.

A failure may arise from vaccinating a child at too early an age, before the system is sufficiently developed to render it liable to the full action of certain morbid conditions. Although small-pox attacks all ages, yet the earliest period of infancy, within the month, is remarkably exempt from an attack. It is exceedingly difficult to obtain any facts on this subject from medical statistics, since they embrace a wider range than would make them available; the diseases of the first period of life that are reported in the bills of mortality, being those occurring under one year, and the first months of life being never particularized. It must, however, have been remarked by physicians, that infants under the age of a month have seldom exhibited a susceptibility to the contagion of small-pox, and by a parity of reasoning, would be also less liable to have its modified form of vaccinia developed in he system. Children ought not, therefore, to be vaccinated, as is sometimes done, as early as the first, second, or third week.

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* Practical Observations on the Inoculation of Cow-Pox, etc., by James Bryce, Member of the Royal College of Surgery, Edinburgh; Edinburgh, 1802.

The virus used may not be in its most perfect form, not being sufficiently elaborated before the eighth day, or from being taken at too late a period. Much difficulty formerly arose from not closely observing the different stages, and consequently by not obtaining it in its perfect state. Experience has confirmed the fact, that imperfect vesicles will result from virus taken before the eighth day, and likewise after the areola has formed. In the last-mentioned state of the vesicle the scab has made considerable progress, and, as Mr. Bryce observes, is pure lymph, desiccated, while the fluid contained beneath it is sero-purulent matter, the result of irritation. This is the reason why the dried scab is so often successful, while the fluid of the vesicle, at this late period, as often fails.

Vaccination is not unfrequently carelessly performed, and very often by unprofessional persons. It should not then be a matter of surprise that failures take place where no care is bestowed on the progress of the vesicle, from which the virus is taken for the purpose of vaccinating. It is not unusual for it to be rubbed and ruptured, when irritation and inflammation, and a purulent matter is secreted, in connexion with the proper virus. The scab, also, may be rubbed off, and that which follows will be composed of desiccated, purulent matter, destitute of the specific character necessary to impart the disease.

Another cause of failure may be the total deprivation of the vesicle of the lymph it contains, whereby the constitutional affection is prevented. I have seen a perfectly-formed vesicle dry away, after having been exhausted of its lymph, without being surrounded by the areola, which marks the extension of the disease beyond the local affection. To prevent such an occurrence two punctures ought to be made, and one allowed to pass unmolested through its stages.

The complication of other disorders, producing great constitutional disturbance, may result in an entire failure of the proper progress of the vaccine disease. Disorders of the skin Jenner regarded as the greatest impediment to the proper success of vaccination, especially such as produced an altered secretion or humor, of whatever kind. On no account, therefore, except where circumstances absolutely demand it, should vaccination be performed when these cutaneous diseases exist, both for the purpose of securing the efficient action of the remedy, and for preventing the more active development of acute inflammations. Those of a chronic nature are rendered milder, according to general observations, but exert an unfavorable influence on the proper development of the vaccine infection. The preoccupation of the skin, it would appear, by any disease whatever, materially affects the vaccine disease.

Febrile action, from whatever cause, invariably modifies the progress of the vaccine vesicle; so also will the use of improper diet, either stimulating or innutritious, whereby the vaccine disease is so modified as to impart but a partial immunity. It is difficult to obtain well-ascertained facts to support this idea, but some instances have occurred where these would seem to be the preventing cause, while general analogy adds greatly to the testimony in its favor. Dentition, when attended with morbid symptoms, has an effect similar to fever arising from any other cause; the punctures become inflamed, the disease is diverted from its natural course, and the vesicle exhibits its change, by the presence of purulent matter mixed with the lymph.

There are certain idiosyncracies, also, that prevent the prophylactic powers of the vaccine disease, if we may judge from the analogy of small-pox, where a perfect exemption is enjoyed by many, while others, who have exhibited deep marks of the pustular eruptions, have been attacked a second time. This fact is familiar to most physicians, and needs scarcely any reference for its proof. It has been mentioned by most writers, and instances are given in the report of the committee of the Medical Society of Philadelphia on this subject, in 1828.

The failures which have been known to take place in the protective powers of vaccination, have suggested the idea of the deterioration of the lymph, from its transmission through the vast numbers of individuals in the course of years, and that it has become necessary to restore its prophylactic powers by retro-vaccination. A change unquestionably has occurred in some instances from the pre-existence of cutaneous and other diseases, and from carelessness in using lymph from vesicles that have thus been affected in their proper development. It is easily understood how lymph taken without sufficient examination as to its purity, may impart a spurious affection, which may be continued through a vast number of individuals without affording the desired protection. It can not be denied that this carelessness has prevailed to a great degree, especially in country places, where it is often difficult to procure the genuine virus, and where the physician is unable to render that attention to the cases which might ensure the employment of pure vaccine lymph on all occasions where it is required. It is, for the most part, considered sufficient that a vesicle is formed, without ascertaining the fact of its being genuine or spurious. An instance of this is given by Dr. W. Hooker, of Norwich, Connecticut,* where virus was sent to three different physicians, and was found by them all to be spurious, producing a ragged suppurating sore in the course of five or six days; and yet this was sent by a physician who had been vaccinating the inhabitants of a whole town. When thus transmitted, there can be no question that the human constitution has altered its full powers, on which its protective properties depend.

Another instance may occur where, without any very manifest disease, a change is imparted to the qualities of the lymph, whereby it has become deteriorated; a sort of latent disease or idiosyncracy existing, by which its qualities are altered. This, however, may very well be classed with the cases just mentioned, although not so well marked, the change appearing in the diminished size of the vesicle. This has been observed by Myer and others, who noticed that the vesicles produced from the stock became from year to year smaller; from which it has been inferred that a gradual deterioration of the lymph in use has taken place. The argument would be a good one if borne out by facts in all cases. There are, however, a far greater number of instances showing that such a general deterioration has not taken place, but that the instances cited are referable to other causes than the effect of the human constitution alone, being the result of the influence of morbid changes, however widely extended this influence may be. Whenever proper precautions are used to secure the employment of pure lymph alone, no such alterations of its powers will take place, if we may judge from the appearance of the pock, and the experience which has been afforded by a number of years in the use of this prophylactic remedy. The vaccine vesicle differs in no respect from that described forty years since; the period or incubation and progress, and the distinctive marks, are the same now as they were then. On what ground, then, can the idea be supported that it has deteriorated? Not on that of general experience, for this goes directly to prove the contrary; and for the occasional failures, there are, as is seen above, abundant and well-ascertained facts, and that failures will occur in the variolated as well as in the vaccinated. The report of the committee of the Philadelphia Medical Society, before referred to, containing the condensed opinions of the most eminent and experienced physicians of that city, shows that confidence has not all diminished; and that its protective powers have not changed, appears from the fact that but one death from small-pox, in the year 1827, came to the knowledge of the committee, out of eighty thousand vaccinated persons, during the prevalence of a most malignant and fatal small-pox.

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* Medical Gazette, February, 1835.

There then appears to be no need of resorting to the process of retro-vaccination to resuscitate the qualities of the impaired lymph; for that in use has passed through tens of thousands, while the protection is as great now as it ever was. If, however, any deterioration should occur from the causes above mentioned, the pure lymph may be more readily obtained by inoculating the cow with fresh variolous matter, and thus obtain a new stock of vaccine virus.

Besides the deterioration of the lymph as a cause of the recurrence of small-pox in vaccinated individuals, it has been supposed by some that the influence of the vaccine disease, as a prophylactic, is gradually destroyed by time, and that the system regains its liability to be affected by the contagion of small-pox. The various opinions that have been advanced on this subject, are the following:

Mr. Brown's idea was, that the effect of the vaccine influence, immediately after vaccination, was a perfect protection; that it gradually lost its protecting powers, until at the end of five or six years it requires renewal, in order to secure its prophylactic effect; its influence, also, wearing out with the progress of life, and requiring periodical renewals.*

Dr. Gregory, taking the test of his ability to revaccinate children as the proof of their renewed susceptibility to the small-pox, found that he was unable to succeed in children under ten years. This proof, he says, is corroborated by the fact, that he has not seen small-pox among the vaccinated earlier than ten years. His experiments, however, go to show, that the susceptibility to small-pox decreases in the protected after the age of twenty-five.† These views are also entertained by Dr. Leo Wolf and Dr. Mohl, of Copenhagen; the former of whom refers it to the changes which occur in the system during the period of puberty.

Dr. Heim‡ refers it to the influence of a portion of such susceptibility being left unextinguished by the primary vaccination, the process of development influencing the capability of receiving the infection, and that in not a few cases this does not exist until some time subsequent to the birth of the child. Vaccination, when performed on young infants, then, is of little avail, but will only succeed as there is a progressive development of the vaccine and variolous susceptibility.

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* Edinburgh Medical and Surgical Journal, 1819.

† Med. Chir. Trans., vol. xii., p. 336.

‡ Quoted in the British and Foreign Medical Review, for January, 1839.

Dr. Thompson, from the facts before him, concluded that the varioloid, or modified disease, occurred at every period after vaccination.*

Jenner, after a very careful examination, came to the conclusion that the change effected in the constitution is not produced by time.

Considerable difference of opinion prevails among physicians of the United States on this subject; but there are not data sufficient to prove the precise time at which this change occurs, or what are the causes of this change. All experience, from the period of the adoption of vaccination to the present day, is in support of the fact, that time does not work a uniform change in the system, to the destruction of the prophylactic powers of the vaccine virus. If it were so, we should often see the aged attacked with the variolous disease. That the period of puberty produces a temporary susceptibility, would seem to be true, for the greatest number of cases of varioloid occurs, it is well known, between the ages of fourteen and twenty-five.

From the extreme difficulty of ascertaining whether an individual has been properly vaccinated; from the influence also of morbid action in the system at the time, interfering with the proper progress of the constitutional affection; or from the peculiar idiosyncracy of the patient, whereby a second attack may occur, it is the safest practice to resort to revaccination whenever small-pox prevails very extensively or with unusual malignancy.

It will not be out of place here to exhibit briefly a few facts in proof of the triumph of vaccination, in addition to the mass of evidence which has accumulated beyond parallel in any other department of scientific investigation.

Before the discovery of cow-pock, it was computed that forty thousand persons died annually in Great Britain and Ireland, and that fifteen millions of people were carried off by it in Europe, in twenty-five years; according to the statistics of Sir Gilbert Blane,† the average number of deaths in London, for a period of forty-five years next preceding the introduction of vaccination, was 86 in 1,000; the number in the last fifteen years of this period, 90 in 1,000. After the introduction of vaccination, from the year 1804 to 1818, the deaths from small-pox were found to be in the proportion of 53 in 1,000.

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* Op. Cit.

† Med. Chirurg. Trans., vol. x.

In the kingdom of Sweden, from 15,000 persons who were destroyed from small-pox in the year 1779, the number was reduced to 37 in the year 1823.* The greatest reduction took place shortly after the introduction of vaccination, after the year 1801. These statements might be followed by numerous others from the different kingdoms and cities of Europe.

There is no question that our own country would furnish a similar exhibition of facts, could we but have the opportunity of availing ourselves of statistical records as in other countries. These, however, have been kept on a very limited scale, and official returns of deaths in our large cities and extended districts of territory have been commenced but comparatively a few years back. By comparing the effects of small-pox, when vaccination was not in use, with the present day, our country also exhibits in a striking light the benefits resulting from vaccination.

The early history of America contains some accounts of the ravages of small-pox among the Indians; they are but mere fragments, but are sufficient to show its frightful mortality. It prevailed among the Iroquois with great severity in 1663, as related by Charlevoix.† He does not give the number destroyed in this pestilence; but in a subsequent one, in 1670, near Trois Rivières, he states that 1,500 were attacked, and not one recovered.‡ Other early travellers also mention the extensive fatality of small-pox.

Dr. Douglass, in an essay published upward of a century ago in Boston,|| states that "in the year 1721 we had in Boston 5,989 ill of the small-pox, whereof died 844; of these, upward of 80 died with purple spots and hemorrhages, whereof 65 came to my knowledge." "The small-pox," he remarks, "rendered the large and populous town of Boston a mere hospital." All these cases, it is represented, were of the greatest malignancy, with bloody urine, "bloody spittle," and hemorrhage from every part, and some dying, "wallowing in their blood." No age nor sex was exempted from it in its worst form. Adults of 60 years, and infants of six months, were alike carried off by "purples and hemorrhages."§

The more accurate accounts furnished of late years, exhibit a

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* Evanson and Maunsell, p. 252, Amer. edit.

† Hist. et Descript. Gén. de la Nouvelle France, vol. i., p. 378.

‡ Ib., vol. ii., p. 428.

|| A practical Essay concerning the Small-Pox, by William Douglass, M. D.; Boston, 1730.

§ The following passage occurs in a public address, delivered at Boston in the year 1698: "The angels of death have often shot their arrows of death into the midst of the town; the small-pox has especially, four times, been a great plague upon us. How often have there been bills, desiring the prayers for more than one hundred sick in one day, in one of our assemblies. In one twelvemonth about one thousand of our neighbors have, one way or another, been carried to their long home." Magnolia Christi Americana, or the Eccles. Hist. of N. E., by the Rev. Cotton Mather; London, 1702.

truly frightful picture of the ravages of small-pox in the remote region of the west; the whole country through which it passed, the Upper Missouri, in the year 1837, being literally depopulated. The following is the summary of this pestilence from one near the spot.* The Mandan tribe had been reduced from 1,600 to 31. The Gros Ventres, or Mintarees, a tribe numbering 1,000, took the disease about a month later than their neighbors, the Mandans; one half had already perished at the time of writing the letter, and the disease was still increasing; they doubtless shared the same fate as the Mandans. The Ricarees, 3,000 in number, were also attacked, and not one in 50 recovered. The Assinniboins, 10,000 strong, and the Crees, numbering about 3,000, have been almost annihilated; and of the Black Feet Indians of the Rocky mountains, one tribe, consisting of 1,000, it was ascertained, had been entirely exterminated.

Small-pox in New-York, in the year 1815, was so virulent as to attack almost every individual in whom the susceptibility had not been destroyed by vaccination. The proportion of deaths from the confluent kind, in the opinion of the committee of the Medical Society, appointed for the purpose of inquiring into the efficacy of vaccination, was greater than was ever observed in London, or on the continent of Europe.† Of 254 deaths from small-pox, recorded in the city inspector's register, somewhat more than one third were of the confluent kind. With such facts of the virulence of the disease, what would have been the condition of the city had the ravages of the disease not been controlled? Judging from what has heretofore occurred, every dwelling would have been literally a loathsome hospital, and every surviving inhabitant a terror-stricken mourner.

The number of deaths in New York from small-pox, since the year 1805, a period of thirty-five years, is a trifle over 3,000; in some of the later years of this period the number has increased, yet the comparative number is less than at the commencement of the term, when the population was about two thirds less than it is now. In some of the years there is no report of deaths from this cause; and the proportion in the period of five years, when it prevailed most, exhibits less than 26 deaths in 1,000.

The following calculation exhibits the proportion of deaths in the city of New York, in every thousand, from the year 1805, when the reports were first made, to the end of the year 1840. During the first period of five years the number was 26 in 1,000; in the second period, 14; in the third, 23; in the fourth, about 25; in the fifth, 18; in the sixth, 21, and in the seventh, at the close of 1840, 21. That the mortality has not been greater, is a matter which would naturally create some surprise, when it is considered that the number of emigrants has greatly increased within a few years, among whom the disease prevails with great severity. Vaccination being universally adopted by the permanent inhabitants of the city, they are by no means the class among whom the disease prevails; but it spends its violence among the transient emigrant population, where vaccination, it is fair to suppose, has been neglected; for when questioned on this subject, they often give no satisfactory answer.

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* Letter from Major Pitcher, U. S. A., dated St. Louis, Feb. 27th, 1838. Published in the journals of the day.

† Report of the Medical Society of the City and County of New York, 1816.

Philadelphia, according to calculations made from the published statistics, exhibits rather less than 21 in every 1000 deaths from small-pox, during a period of twenty years; and although in some years corresponding to those in which the disease prevailed with more than usual malignancy in New-York, there was a considerable increase in the actual number of deaths, yet they bore the same proportion to the inhabitants as in the latter city.

Small-pox, it was remarked, prevailed during a few years with great severity, and the comparatively small number of deaths is an evidence of the protective power of the vaccine disease. Every variety, from the mildest varioloid to the most fatal confluent form, was to be found existing simultaneously—the former, among those in whom the susceptibility had been partially destroyed, either by a previous attack, or by vaccination, and the latter, among those who had never been protected; all being equally exposed to the action of a high degree of contagion.

Similar results have been found in other cities of the Union, proving that the benefits of vaccination are to be seen mostly in the immense saving of human life, and not in the universal exemption of every individual vaccinated, from an attack of small-pox, when exposed to a highly malignant contagion. This exemption does not exist in every instance, after an attack of small-pox itself; and individuals, with the most unequivocal evidences of having had the disease, have been again attacked, and have died, where it has prevailed with great severity.

The full benefits of vaccination are not to be found by seeking for them indiscriminately among the inhabitants of large cities, who are constantly exposed to the numerous causes which produce failure in the progress of the vaccine vesicle, but among those who enjoy all the benefits of professional skill, not only in the selection of proper virus, but also in ascertaining the proper development of the constitutional symptoms. We might, therefore, expect to find it in its most perfect state where these requisites are enforced, as in public institutions, and wherever the necessary measures are fully adopted. The following are a few of the results obtained from these sources.

In the year 1815, the small-pox appeared on board the U. S. Frigate Guerriere. An inquiry was instituted by the surgeon, to ascertain whether those attacked had ever been vaccinated, when it was ascertained that none of them had ever had it. Not one of the crew who had been vaccinated took the disease in any form.*

In the different institutions for the reception of children, the greatest care is bestowed on the details of vaccination, and it is under such circumstances that we are to look for the full results of this important preventive measure, up to the age of fourteen years, the average period at which the children are discharged.

In the Orphan Asylum of Charleston, S. C., which in the year 1829 contained one hundred and fifty children, not a single case of small-pox or varioloid occurred during the prevalence of that disease, although no additional restriction was imposed upon their intercourse with the citizens.†

The aggregate number of children received into the different orphan asylums of Philadelphia, since their establishment to the beginning of the year 1841, is 1,009, and among the whole, there has been but one death from small-pox; this occurred some years since, out of sixty-five cases of the disease. The children were carefully examined, both with reference to the virulence of the affection, and to their condition at the time of the attack. Ten were without the usual cicatrix left by the vaccine vesicle, and the child that died was one of the number destitute of this mark.

In the city of New York, the total number received in all the orphan asylums, is 2,384; and although the small-pox appeared in two or three of them, yet it was in a greatly modified form, and no deaths have occurred from this cause. A similar result is obtained, also from the House of Refuge, which exhibits an aggregate number of 2,657 children received during sixteen years. The whole number, therefore, that have been inmates of these various institutions in the city of New York, is 5,041, and not a single death from small-pox has at any time occurred.

Baltimore, also, presents the like return, out of 3,500 children that have been for several years in the alms-house and different orphan asylums of that city.

The entire number of children, therefore, that have been under the care of the above-mentioned institutions, since their establishment, is 9,550, and but one death has occurred from small-pox in the course of thirty years; and this one it is fair to presume had not been vaccinated, as no mark of this operation was found after the most careful examination. The aggregate number that have been received in the above-named institutions amounts at this time, November, 1843, to upward of 11,000, without any variation in the results of vaccination already stated.

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* Report of the Med. Soc. of N. Y., 1817.

† Report of the Committee of the Board of Health of Charleston, etc.; Amer. Journ. Med. Sciences, November, 1831.

The results of vaccination thus ascertained, can not be followed after the children have left these institutions, but up to that time the benefits may be learned by comparing with them the effects of small-pox before the introduction of vaccination; its ravages being principally among the young. At this day, also, the small-pox is more prevalent and fatal among children; as appears from the city inspector's report of deaths in the city of New York, for the last few years. Ninety-one deaths are reported to have occurred from this cause, in the year 1838; 69 of these were children under ten years; and in 1839, 68 deaths were reported, 45 of which were among children of the same ages; and of 231 deaths from the same cause in the year 1840, 131 were also children not yet arrived at the age of ten years. To whatever cause this number of deaths is to be attributed, whether to an imperfect vaccination, or its neglect altogether, the comparison shows the triumphant results of the prophylactic measure now universally adopted.

The value of the discovery of vaccination, as was before remarked, does not consist in its entirely preventing an attack of small-pox, but in disarming it of its terrors—in reducing the mortality, which it has been seen makes it one of the most fatal scourges of mankind, to a very small amount; a result not obtained even by the small-pox itself, many more deaths having, as has been sometimes observed, occurred among individuals after having passed through that disease, than among those who had been protected by vaccination. The recorded statistics of Drs. Mitchell and Bell, of the result of their experience during the epidemic of Philadelphia, in 1823 and 1824, also prove this fact, which has been noticed by others. Of 248 cases of small-pox and varioloid, 155 were unprotected, of whom 85 died; 64 *vaccinated*, of whom 1 died; 9 *inoculated*, of whom 3 died; 7 previous small-pox, of whom 3 died; 13 unknown; no deaths.*

When these results of the two methods are considered, how striking are the advantages of vaccination, not only in saving human life, but also in its direct tendency to exterminate a loathsome malady altogether; and when the many causes which are known to exist that influence the proper development of the vaccine disease, and the carelessness which must prevail in the thousands of instances of vaccination, are taken into account, far from having our con fidence lessened, when the results do not accord with our most san guine wishes, these circumstances should on the contrary strengthen our faith in the salutary influence of a remedy, which still must be regarded as one of the greatest blessings to man.

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* N. A. Medical and Surgical Journal, vol. ii.

SYPHILIS.

Syphilitic affections sometimes occur in infants, transmitted either from the mother to the fœtus, or communicated during the passage of the child at birth, from venereal ulcers, or from the nipples of an affected nurse.

Although the hereditary transmission of syphilis has been denied by some, the numerous facts on record unequivocally settle the question of the congenital origin of syphilitic eruptions. Hunter gives the case of a woman who was covered with venereal pustules, giving birth to twins, who likewise had similar pustules on their bodies.* Mr. Bell mentions the fact of his having seen many infants at birth thus affected, without any external marks of the disease on the parents,† and a number of cases are cited by Rayer, from Schenk, Rosen, Swediaur, and Mahon. Dr. Brown, in the Cyclopœdia of Practical Medicine, gives a similar fact. Dr. J. W. Francis, in a note in the third edition of Denman's Midwifery, mentions the fact of three instances having come under his observation. A remarkable case of the transmission of syphilis to the offspring is recorded by Dr. H. D. Bulkley, in an able article on the syphilis of infants,‡ where the father, after having been to appearance cured of a venereal affection for four years, married, and the child that was born at seven months, exhibited the usual symptoms of syphilitic disease. From these and numerous other similar facts, it is evident, that either one or other of the parents is affected with the syphilitic poison at the time of conception, although presenting no external marks of the disease. This is evident from the child being affected with the disease, traceable to no other source. Several children have also been successively born covered with syphilitic eruptions; or miscarriages or premature birth have occurred, where the bodies of the fœtuses have been in a similar state. The last is not an uncommon event about the sixth or seventh month, and is so frequent as to be regarded as one of the causes of abortion.

It is not every eruption on the body of a newborn child, for the production of which a syphilitic cause is supposed to exist, that is to be regarded as a disease of this nature. Newborn children have often been seen covered with vesicles and ulcerations bearing the appearance of venereal sores, but which disappear of themselves. Such cases M. Billard has met with at the Foundling Hospital at Paris, and regards them as a species of eczema. A species also of pemphigus bears a close resemblance to the lues of infants, while psoriasis, some forms of rupia, impetigo, and other ulcerations, may be mistaken for it. But notwithstanding the numerous errors which may arise from mistaking these morbid conditions of the skin, no doubt can remain of the congenital transmission of true lues. The fact of nurses having had the venereal disease, exhibiting its true characters developed in them through the medium of the nipple, and in their turn communicating the disease to their offspring in its most unequivocal form, sufficiently establishes the truth of this assertion. Dr. Bulkley, in the paper before referred to, mentions the case of a female who was affected with unequivocal symptoms of secondary disease derived from a sucking child, and who was delivered of a dead child from this cause, and afterward of two living children with the marks of syphilitic disease, which was afterward conveyed to another perfectly healthy nurse by one of them. An instance of two nurses being successively infected with the venereal disease in this manner, is given by Bell.*

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* Hunter on the Venereal; London, 1776.

† Treatise on Gonorrhœa and Lues Venerea, by Benjamin Bell, p. 259.

‡ The New York Journal of Medicine and Surgery, for October, 1840.

These circumstances, in connexion with the fact of the previous existence of the disease in either of the parents, and the effects of remedies, satisfactorily establish the nature of the affection.

The child may also receive the infection during its passage, from the external parts, on which there exist syphilitic ulcers. Under these circumstances the disease is more likely to appear about the eyes, lips, or genital organs; parts which possess greater vascularity than other external parts of the body. It is the opinion of some that the thick secretion covering the skin of a newborn infant prevents the manifestation of the disease on the general cutaneous surface.

The communication by means of a nurse is by no means uncommon, although, according to the opinion of some, as Hunter, Girtanner, and others, it does not occur except in those cases in which the nipples are diseased. Gardien entertains a different opinion on this subject, and considers the milk to possess infectious qualities.

Children with congenital syphilitic disease are remarkably delicate, whether premature or otherwise, with a general appearance of debility, all the muscles being soft and shrunken. In some, the whole aspect is that of an aged person. When an infant is born with the external marks of the disease, an erysipelatous eruption is the usual form of their appearance in some parts of the body, while in others the cuticle is destroyed. The nails on the fingers and toes have been also wanting. This eruption is of a copper color, and its character may be strongly suspected when there is evidence of a syphilitic taint in the parents, or when, from their history, such an affection has previously existed.

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* Op. Cit., p. 260.

The child sometimes will not exhibit any signs of the disease until an indefinite time after birth, but usually from fourteen days to two months after birth; in some instances not until three months. When delayed beyond six weeks or two months, it is generally developed by the existence of some other excitement in the system, as vaccination, dentition, or the changes which occur on weaning. In twenty-eight cases occurring to Dr. Bulkley, "the symptoms first appeared at the end of a month in nine cases; between one and two months in six; between two and three months in six; between three and six months in two; between six and twelve months in three; at or about twelve months in two; so that of the twenty-eight cases, twenty-one appeared at or before the end of the third month."

x Disease first shows itself

x The disease usually shows itself first in the skin, generally about the nates and pudendum, in the form of irregular blotches, of a color varying from that imparted by the stain of a strawberry, to the copper color so commonly described as the peculiar aspect of syphilitic eruptions. These blotches are slightly raised from the level of the skin, forming elevated ulcers on the nates, neck, and shoulders. On the face they quickly become covered with scales or scabs. The eruption assumes different characters, being in some instances, and in different stages of the disease, spots or patches, pustules, tubercles, excoriations, and ulcers.

As the disease advances, the various tissues and parts become affected, and exhibit a combination of symptoms, both characteristic of the extent of the infection, and of the general debility and extreme loathsomeness of the wretched infant. The emaciation is extreme; the cachectic appearance of the whole of the skin marks the universal operation of the poisonous principle. The skin is generally of a brown or copper color in the intervals of the scabs; the lips are swelled and deeply fissured, and aphthæ appear in the mouth. The voice is shrill and feeble; the breathing is difficult through the nose, producing the well-known sound of snuffles. This last symptom often precedes the cutaneous eruption, and is followed by a discharge of yellow inspissated mucus from the nares.

The history of this affection will greatly assist in its diagnosis; but this may be at times difficult to ascertain with any degree of accuracy; indeed, the necessity of great circumspection in our inquiries will sometimes preclude the obtaining of sufficient data from this source. The character of the eruption, its obstinacy under other treatment than that usually resorted to in the management of syphilis, will generally excite a suspicion as to its nature. The whole appearance of an infant infected with syphilitic poison is so characteristic, differing so essentially from the appearance in any other disease, but difficult of description, that even one not familiar with it will be struck with the remarkable and unusual physiognomy. The itch occasionally becomes very severe, and degenerates into obstinate ulcers; these, however, are of a more pustular character than the condylomatous ulcers of syphilis, and are accompanied with severe itching. In connexion with the history of the affection in the parents, is the occurrence of abortions, with the cutaneous affection above described. Where a living child has been brought into the world with an eruption, but little doubt can exist as to its nature.

Syphilis, when subjected to medical treatment, is not a disease of danger; and the prognosis may, for the most part, be favorable.

Treatment.—The preventive treatment, by the administration of suitable medicine to the parents, is that which has been recommended when there is undoubted evidence of syphilitic disease in them; or where, from the occurrence of the birth of children affected with it, the syphilitic taint exists without its external manifestation. Where both have previously been affected, they should both be brought under the mercurial and alterative course. This plan, however, often fails of producing the desired effect; but as it has in some instances succeeded, it is best to adopt the safest course, and administer alteratives to one or both parents. Sometimes the infection takes place during utero-gestation. It will, under these circumstances, be necessary to administer mercury to the mother as soon as the affection is ascertained. No doubt can now exist on this point, although many have objected to the giving of mercury to pregnant women. The decided advantages both to the mother and offspring more than counterbalance any bad effects which may arise from its use. The other preventive measures are, preventing the child from coming in contact with the syphilitic ulcers, by freely anointing the diseased part with lard, and causing the child to be carefully washed immediately after its birth.

Mercury must, in most cases, be given directly to the child, as the only method to be relied on for the perfect eradication of the disease. Most practitioners bear evidence to the advantages children derive from the administration of mercury in this affection, and to the little constitutional irritation following its use when judiciously administered. The most eligible form in which it can be given, is the hydrargyrum cum cretâ, a grain or two twice a day, until an alteration in the eruption begins to appear, when it may be suspended for a few days and then resumed, if the syphilitic symptoms do not evidently lessen. A quarter of a grain of calomel, mixed with sugar, is also a good form of administering mercury. The blue pill, as possessing less irritating qualities, may also be advantageously used in infants, mixed up with syrup. The bi-chloride of mercury is useful for children; it is easily given, in the dose of one twentieth to one twelfth of a grain, and it is said by some to be more prompt in removing the disease than any other preparation. Dr. Cogswell, in his essay on iodine, speaks of the good effects of the proto-iodide of mercury in syphilis of children, especially in the cutaneous affection; and other practitioners prefer it before any other preparation of mercury.* The annexed formula is that which was employed by Ricord.† Whatever preparation of mercury is used, the syrup of sarsaparilla ought to be combined, and the warm bath frequently used. Tonics, good diet, and pure air, will very materially aid in effecting a cure in feeble children. Bitter infusion, or a weak solution of sulphate of quinine, will greatly assist the specific action of mercury in debilitated children, when it has been continued for some time without any marked alteration. The bowels are sometimes brought into an irritable condition by the continued use of mercurials, and a diarrhœa will arise; this may be controlled by a small dose of tincture of opium, or by combining minute portions of Dover's powder with the mercurial. The latter is decidedly preferable, from its action on the skin, and the secretion which it excites in the emunctories.

Under this course, about two or three months will be required for the removal of the disease; but upon its disappearance the use of medicine must not be discontinued, as it is no unusual circumstance for the affection to re-appear; when it will become necessary again to resort to a mercurial cause.

Local applications are necessary for the proper management of this disease; and the black wash, yellow wash, and ointment of the different preparations of mercury, are all useful applications to the several ulcers. To those that exhibit an indolent appearance, the sulphate of copper or nitrate of silver must be used, while narcotic emollient fomentations will be found useful in painfully excoriated parts. Constant ablutions must be used throughout the whole course of the treatment.

While attention is thus bestowed on the child, the mother or nurse should not be neglected, as the affection of her system becomes necessary where the disease is of any obstinacy; and an evident change in all the symptoms will quickly appear when the proper remedies for lues are given to her. Alteratives, such as the decoction of the woods, are advised for her, where the syphilitic disease is not apparent; but mercury should in all cases be given, where there is any evident syphilitic disease existing.

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* La Lancette, 1834.

† ℞ Hydr. Proto-Ioduret, gr. vi.
Extr. Opii., gr. iv.
Lactucarii, gr. xxiv.
Ext. Guiac., gr. xlviij.
One pill for a child a year old.

SCABIES.

This is a well-known inflammatory and contagious affection of the skin, characterized by a vesicular eruption, attended with a violent itching, from which it receives the name of itch. The vesicles are transparent at their summits, and contain a viscid fluid of a serous nature. These eruptions appear in every part of the body, but always at first in those parts which are placed in contact with the disease in others. Hence it more often shows itself in the hands, and on the breech of sucking infants, parts which are the most commonly brought into contact with the hands of those affected with this disorder.

Etiology.—It is unquestionably a contagious disease, never being produced in any other manner. There are some pathologists, Fabricius, Hildanus, Pringle, and others, who assert that the itch may be produced spontaneously, under peculiar circumstances, and that it occurs as a crisis of another affection; but the frequent complications of the various cutaneous disorders may often render a perfect diagnosis obscure and difficult, and it may be that other vesicular and papular eruptions have been mistaken for this disease. Where an affection is so uniformly contagious, and according to all observation, only traceable from one affected person by contact to another, by the most unequivocal evidence, the idea of its spontaneous origin may be questioned. Whatever may be said of infectious diseases, sometimes originating in this manner, and afterward, through the changes in the atmosphere, becoming communicable, such can scarcely be proved with regard to the itch, which uniformly requires the contact of parts for its transmission.

The itch is more perfectly contagious than any disease known; for it is communicated with almost complete certainty on the slightest contact with the morbid secretions from the vesicles of those affected with it, at all times and at every age. When several children are crowded together with the disease once introduced, it invariably spreads through them all, and is propagated more by contact and by want of cleanliness, than by any causes arising from climate or the season of the year.

It has long been maintained that this affection was produced by a small insect, nearly invisible to the naked eye; and a figure was even given of it in the Theatrum Insectorum of Moufet. Hauptman also published a drawing of it from nature; but a complete description is given by M. Raspail[*] and M. Gas,[†] who have, with great patience and industry, succeeded in their investigations, both in ascertaining the form of the insect, of which the former has given a complete and faithful account, and also in investigating its habits with no less ability and zeal; detecting the insect itself in the formation of the first vesicle, or tracing it as it burrowed beneath the cuticle. On one occasion the insect took twenty days in burrowing two lines, and another performed the same amount of labor in three days. It is exceedingly minute, of a white color, and may, without the aid of a microscope, be seen on a colored surface.

Treatment.—The only treatment necessary, in recent and uncomplicated cases, is of a local nature; the destruction of the insect is always followed by a cure of the disease. It has been observed by Dr. Willis, in the appendix to Rayer's work on the Diseases of the Skin, that the insect is never found alive after the patient has been subjected for three or four days to the ordinary treatment. The most efficacious is the sulphur ointment alone,[‡] or combined with the sub-carbonate of potash.[||] About one ounce of the former should be used daily, by rubbing it over every affected part, and about half that quantity three times a day, for a child eight or ten years of age. A quarter of an hour should be spent in its application, first being careful to wash the body well with soap and water, which should also follow each application. This course will almost invariably cure the disease in three or four days.

In long standing cases it may be necessary to resort to other measures; for from the violent inflammation of the skin and the crowded state of the vesicles, frictions, in the manner above mentioned, may not be admissible. Under these circumstances sulphurous baths are the most easy and efficient remedies. These baths are particularly useful in children. When they can not be had, artificial washes may be used. The annexed is the lotion of Alibert.[§] It may be somewhat varied for children. The sulphurous soap liniment of the Hôpital des Enfants is also a good application in obstinate cases.[¶]

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[*] Mem. Compar. sur l'Histoire Nat. de l'Ins. de la Gale; Paris, 1834.

[†] Recherches sur l'Acarus on Scarcopte de la Gale de l'Homme; Paris, 1834.

[‡] ℞ Sulphur. Sublim., ℥ij.
Adeps. Suil., ℥iv. M.

[||] ℞ Sulphur. Sublim., ʒij.
Potassæ Sub. Carb.. ʒj.
Adeps. Suil., ℥j. M.

[§] ℞ Potassæ Sulphuret.
Acidi Hydrocyanic., āā ℥j.
Aquæ, ℔iij. M.

An ounce of this may be added to four ounces of warm water, and the diseased parts washed with the mixture.

[¶] ℞ Potassæ Sulphuret., ℥vj.
Saponis Hisp., ℔ij.
Ol. Olivar., ℔ij.
Ol. Origan., ʒij.

The sulphuret of potash to be first dissolved in one third of its weight of water; the soap then to be dissolved in a sufficient quantity of water to form a bath, and the oil added by degrees; the solution of potash is then to be added to the whole.

ANIMAL FUNCTIONS.

NERVOUS SYSTEM.

PECULIARITIES OF THE NERVOUS SYSTEM.

The usual division of the nervous system is that of the cerebral and ganglionic; the former connected with the animal, the latter with the vegetative life. The cerebral, or cerebro-spinal apparatus, has its origin in the medulla spinalis; for as early as the fourth or fifth week of the fœtal existence, the medulla oblongata is distinctly seen, while the spinal marrow is also traced in the form of two white threads. It is not until the seventh week that the cerebellum is first discovered. The whole, therefore, of the cerebral mass is a production of the spinal marrow, as the different parts can be traced in their process of development.*

The internal or central part of the nervous system, comprising the spinal marrow and encephalon, is larger in an infant in proportion to the body. The latter, especially, continues proportionally larger until between six and seven years, when it has acquired the weight which continues throughout life.

During the period of development in the fœtus, there is nothing so remarkable as the change of form in the different parts, as they are not the same parts in miniature, but gradual and successive alterations. These alterations, however, do not come within the limits here allotted to the subject, which is only the consideration of the nature and operations of the nervous system from the period of birth.

The internal surface of the spinal marrow is in early life continuous with the external, as the entire canal is much larger, and its surfaces much more uniform than in advanced life.

The proportion between the spinal marrow and the cerebrum is as one to one hundred and seven in the full-grown fœtus and the child of five months, although the actual volume of both in the latter is three times as great as the former; in the adult the proportion is as one to forty.

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* Anatomie du Cerveau, etc.; from the German of Tiedemann. Translated into French by N. G. L. Jourdan; Paris, 1823. Serres, Anatom. Comparée. Meckel.

The medulla oblongata, in its different parts, is much more developed in early life than at a later period, especially in its lower anterior portion. It is therefore more distinct than the spinal marrow.

The cerebellum is the latest developed of all the parts of the central mass of the nervous system. At birth its proportion to the cerebrum is as one to twenty-three, the cerebrum weighing about nine or ten ounces, and the cerebellum about three drachms and a half. It grows very rapidly, so that in one month its proportion is as one to seventeen, and at six months as one to eight, when its weight is about two ounces. It increases remarkably in size about the period of puberty.

The cerebrum is at first large in size, but imperfect in structure; it is a soft semi-fluid substance, and evidently less advanced in structure than the medulla oblongata or medulla spinalis. Although at the time of birth it has the general form of an adult's brain, yet it differs much in its appearance as well as in its consistency. It is white, with very little well-marked distinction between the cineritious and medullary matter, and the appearance denominated the centrum ovale does not exist on cutting through the hemispheres, as in the adult. On a close examination, the boundaries of the cortical substance may be detected in the form of a line passing over the superfices of the brain. There are a number of vessels ramifying through it at the age of six or eight months, which imparts to it at that period a reddish tint, rendering the distinction between the cineritious and medullary portion difficult to distinguish.

In the early period, as was before remarked, the appearance of the brain, when cut, is white. In this respect, and as to its consistency, it bears a close resemblance to the article of confectionary denominated blanc mange. It does not alter much in consistency until about the seventh year, when its density and weight are about the same as in the adult.

The exact alterations which the brain undergoes have not been ascertained with any tolerable degree of accuracy; they however appear to take place before the ninth month, when the gray substance exhibits a reddish appearance, showing an increase of vascularity, and an exaltation of its vital energy. This change, it has been remarked, occurs in those parts nearest to the medulla oblongata, according to the order of development.

From this period the brain advances remarkably in its complete organization; it is then that the signs of intelligence are first displayed. Its consistency becomes much firmer, and the medullary and cortical portions more evident, while its convolutions are more defined. These increase in distinctness, and about the seventh year the whole presents the firmness and arrangement of the adult.

At this time, also, the pineal gland exhibits the first appearance of the concretions which are usually found in them.

The changes of the brain, and the increase of size of that organ, seem to require some peculiarity in the arrangement of its coverings; we consequently find the bones of the skull in an imperfect state of ossification, whereby a change in the size of the brain may take place, without subjecting it to compression. The bones composing the cranium are not united by the sutures which are found in the adult, but are entirely separated, while several deficiencies exist in different parts of the skull.

These openings, or fontanelles, are six in number; the largest, on the top of the head, is called the bregma, and is formed by the deficiencies which exist at the place where the parietal bones and the frontal bone afterward unite. Another is situated at the posterior part of the head, between the parietal and occipital bones; and two on each side, the one in the temporal fossa, and the other above the mastoid process.

All these openings gradually close as the ossification of the bones advances; and about the fifth year the sutures are all united, and the entire cranium exhibits the same condition as in the adult state. The size of the head varies, and its shape also is different in different individuals, for there exists not unfrequently a marked variation with respect to the relative proportions of the regions of the brain.

The movements of the brain are easily seen in the infant, particularly in the anterior fontanelle or bregma. There are two, clearly marked; the one depending on the action of the arteries, the other arising from the act of respiration; the last-mentioned movement is less frequent than the first. When the hand is placed over the opening in the skull, the parts beneath are found to rise and fall, which, when owing to the respiratory process, is produced by the alternate expansion and contraction of the encephalon.

The membranes covering the brain are much more vascular in early life than at a later period. A larger quantity of fluid exists between the arachnoid and the other membranes, and also in the cavities, than in after life. The glands of Pacchioni do not in general exist in children. The dura mater is much thinner than in the adult, and its adhesion is less firm.

The brain being in a very imperfect state of organization at the commencement of life, the peculiar functions of this organ do not exist, and a newborn child is even devoid of ordinary perception.

For the first nine or twelve months the brain is in an active state of development, and passes through the various changes necessary to its perfect formation. An increased quantity of blood, therefore, becomes necessary for the transition of this organ from the pulpy mass, apparently devoid of parts, to its proper state of perfection. Hence the strong tendency to severe cerebral disease, and the frequency of effusion and convulsive affections.

The imperfect organization of the brain explains, also, the absence of those impressions which are made as the child advances in age on the organs of sensation; while the organic sympathy is remarkably active, from the much more perfect development of the nerves of the spinal marrow, which are found in the fœtus of six months perfectly white and fibrous, while the cerebral nerves are still gray and soft. To the perfection, also, of the ganglionic or great sympathetic nerve, which is more developed in the early periods of fœtal existence than any other portion of the nervous system, is the peculiar feature of an infant's constitution to be referred —the extreme susceptibility and extensive and rapid sympathy by which abnormal action is so suddenly transferred from one part to another. Although this nerve decreases in size, yet at birth it presents nearly the same proportions which exist afterward.

The ganglionic system of nerves is the great agent which controls and regulates the processes of nutrition and circulation; for fœtuses have been found destitute of a cerebrum, cerebellum, and medulla spinalis; and where the investigation has taken place, the ganglionic system has been seen perfectly developed. After undergoing in the uterus the proper development of the vegetative life, such fœtuses have died from inability to respire, the nerves of respiration arising from the cerebro-spinal centre.

The superabundance and greater activity of the nerves of vegetative life, those on which the growth of the body materially depends, are therefore the great sources of the remarkable nervous sensibility, so acute and so rapid as it appears in infancy, uncontrolled, as it were, by the exercise of those which appertain to the animal life, and also by the great antagonist of all the nervous system, the muscular apparatus.

From the gradual transition of the brain to its perfect state, it might be anticipated that, as the infant increases in age, the senses manifest the impression made on them, in proportion to the development of the brain and the nerves conveying the impression.

It is not long before the infant shows its partialities or dislikes—the first manifestation being in the organs of vision. Bright objects attract the attention of the infant at a very early age; and it will soon be remarked that it fixes its eyes on any brilliantly illuminated object, as the bright light of a window, or the glare of a lamp. To gratify this desire infants will often subject themselves to inconvenient postures; hence the importance of preventing a glare of light from falling obliquely on the child, as the eyes and neck will be distorted by its efforts to turn toward the light.

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Hearing would appear to be much less exercised than seeing, for the loudest noises do not disturb a young infant even at the period when sight is so much enjoyed. The whole of the auditory apparatus is in a very imperfect state.

The sense of taste evidently exists, but not to any great extent, as it often appears to be a matter of perfect indifference what the infant swallows, and a nauseous substance may frequently be given without its manifesting the presence of any unpleasant sensation. That of smell is much less formed.

The sense of touch, whereby we perceive some of the qualities of bodies, scarcely exists in infants, and is slowly developed, some degree of experience being necessary to perfect this sense.

The last that are developed, following the organization of the brain, are the perceptive and reflective faculties.

SIGNS OF DISEASE FROM THE NERVOUS SYSTEM.

Delirium is very common in children on the occurrence of the slightest fevers; and on this account does not afford so unfavorable a prognosis as in older persons. Their delirium in ordinary febrile excitement is slight, and they can easily be roused to a consciousness of their situation. When, however, severe inflammation of the brain exists, the delirium is more continued, and is proportioned to the degree of inflammation. It is often present from the irritation caused by worms, and in general is not unfavorable; but continued sympathetic excitement of this organ may eventually terminate, in the highly susceptible state of an infant, in hyperœmia of the brain, or its membranes.

Vertigo, or dizziness, is an unfavorable sign in young children, and during the existence of eruptive epidemics indicates a serious invasion of the disease.

Children are at times morbidly sensitive to all external impressions, even to slight noises; this, at the commencement of disease, indicates irritation at the central part of the nervous system. During apparent convalescence, also, it gives an unfavorable prognosis, and is often followed by sudden cerebral effusion.

An infant sleeps the most of its time. Natural, quiet sleep, is a favorable sign under all circumstances. Sleeplessness, therefore, when it occurs after convulsions, or any sudden affection, after the violent symptoms have been relieved, indicates a morbid irritability of the brain. The absence of sleep, or short sleep at the commencement of acute diseases, is not unfavorable, and almost invariably exists on the invasion of such diseases.

Excessive sleep in children who have past the period of first infancy, denotes in general, softening, effusion, or concussion. When

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the child is teething, it often indicates cerebral pressure, from an excessive flow of blood to the head. The various states of deep sleep, denominated sopor, coma, and carus, always denote some cerebral affection, either congestion or inflammation, and are unfavorable when occurring after any acute disease, or the exanthemata. Uneasy sleeping and tossing about in bed are very common in children, and not of themselves to be regarded as of any importance; but movements of a convulsive character usually precede acute disease, or are the sign of worms in the intestines. Sudden awaking, where the patient can not immediately recollect himself, often occurs in children suffering from the irritation of worms. Dreams of a frightful nature indicate a morbid activity in the brain, and, at the commencement of acute diseases, mark the probable severity of the affection. Grinding of the teeth usually attends the presence of worms in the bowels.

The common sensation, it is obvious, does not in children give so good a diagnostic sign as in adults, from the difficulty of ascertaining its existence. It does not, however, differ from a similar exhibition in adults.

The feeling of cold or heat does not exist in proportion to the sensation conveyed on touching the skin. In some severe cases of fever the feeling of the skin will be cold, while the child will not allow of its being covered, apparently from the feeling of extreme heat; the arms and legs are immediately thrown outside the bedclothes whenever they are covered. The alternation from shivering to heat in children, is one of the signs of spinal inflammation; such a disease may be supposed to exist when this alternate heat and cold perseveres for a long time. At the commencement of disease it is a symptom of but little moment. Great heat usually precedes exanthematous fevers.

Pain in general, as in the adult, indicates an affection of the organ affected, and may be of simple irritation or inflammation, the latter generally ascertained on pressure. This is one of the difficult things to diagnose in young children. Pain is, in all probability, very severe in them, depending, as it greatly does, on the state of the nervous system, which is in a high state of susceptibility, and consequently morbidly acute to all impressions. Severe pain in the orbital region, which may be ascertained when children are old enough to describe their sensations, generally precedes hydrocephalus, if long continued. So, likewise, any long-continued pain in the head may lead to the suspicion of the existence of severe inflammation preceding fatal effusion. Heaviness of the head should in no case be disregarded in young infants, as it is a precursor of the same disease. Violent, sudden, lacerating pain, marked by loud and sudden screaming, with the application of the hands to

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the head, denotes the existence of deep-seated inflammation of the brain, and usually precedes the effusion of serosity.

With respect to the expression about the face, the eye affords some important diagnostic signs. The departures from the ordinary expression of this organ, are for the most part indications of cerebral disturbance.

The pupil of the eye is naturally much larger in infants than in older children or in adults. This should always be kept in mind when examining the condition of a young infant; and even a more than usually dilated pupil is not always a sign of cerebral effusion, for any pressure on the brain, as that arising from a too great fulness of the blood-vessels, will produce a dilatation of the pupil. An enlarged pupil also indicates a sympathetic affection of the brain, from irritation in the stomach and bowels, often caused by worms. Idiopathic cerebral affection may be known by the permanent dilatation of the pupil; and it usually marks the presence of fluid in the ventricles, a condition which may reasonably be supposed to exist when following cerebral inflammation. This also gives an unfavorable prognosis when it occurs during the progress of hooping-cough. After convulsions, also, especially when the child is in a soporose state, and lies with its eyes partly open, the enlargement of the pupil indicates cerebral effusion.

A contracted pupil is a common condition during the sleep of an infant, and yields no diagnosis; but the contraction with the eyes partially closed when awake, and a knitting of the eyebrows, mark the first stage of acute hydrocephalus, or inflammation of the cerebral meninges. An irregular movement of the ball of the eye denotes, also, inflammation of the brain, but of less extent than the permanently contracted pupil.

Strabismus, when occurring after the usual marks of inflammation of the brain, is an unfavorable sign, especially if it make its appearance suddenly. When gradual, it marks some slight abdominal affection, or the influence of the exposure of the eye to oblique rays of light. Congenital strabismus either occurs in chronic congenital hydrocephalus, or denotes the natural contraction of one of the muscles of the eyeball.

When the eyes are fixed and staring, or when there exists any unusual expression in them, some cerebral disturbance is present, and convulsions may be anticpated. A child will not unfrequently start from sleep, and, apparently unconscious of surrounding objects, stare wildly, and then lie down quietly; this symptom is usually an indication of some intestinal irritation.

The expression of the face, arising from the movements of the facial muscles, affords a good means of diagonising the diseases of children, and aiding the practitioner to detect the existence of local affections, where the ordinary means of ascertaining the presence of local pain are absent, as is the case in infants. An alternate expansion and contraction of the nostrils attend affections of the pulmonary system. The tumefaction of the nose and lips usually indicates worms.

When the mouth appears to be enlarged, and the lips are closely applied to the teeth, while the chin is projecting, serious inflammation of the small intestines and stomach exists. A continued lateral movement of the lower jaw, like the action of chewing, is an unfavorable symptom.

M. Jadelot was the first to reduce the movements of the face to a systematic order, whereby they were made instrumental to the more perfect diagnosis, the location of their affections in one or other of the great splanchnic cavities.*

The first trait, he remarks, commences at the angle of the eye, and loses itself in the projection of the cheek, and is denominated the oculo-zigomatic trait. This trait or lineament indicates the seat of disease as being in the cerebro-nervous system. When cerebral disease supervenes on other affections, this lineament appears, as in hooping-cough, or affections of the primæ viæ. It may therefore often be seen to precede convulsions or hydrocephalus, occurring after intestinal affections.

The second appears at the wing of the nose, and passes in a semicircle, more or less complete, around the external edge of the orbicularis oris muscle; it is that which is seen in affections of the primæ viæ. The nasal lineament, as this is denominated, more particularly points out inflammation in the large intestines, or dysentery.

The third trait or lineament is the labial. It rises at the angle of the lips, and loses itself in the lower part of the face or chin. It points out diseases of the heart, large vessels, and air-passages.

These expressions of the face, in connexion with other semeiological marks, will enable the physician to diagnose the diseases of infancy with sufficient accuracy for all practical purposes.

DISEASES OF THE NERVOUS SYSTEM.

CONVULSIONS.

The nervous system in infants is naturally in a very susceptible condition; it is consequently easily excited on the application of the slightest impressions. This constitutional irritability is characteristic of the infant state; and while it shows itself in the sudden invasion of diseases, and their remarkable transmission from one organ to the other, it also exhibits itself in the deranged action of the nervous system, and the consequent irregular and violent action of the muscles. The frequency of convulsions in children has long been noticed by physicians, and their great fatality renders it of the utmost importance that their causes and treatment be well understood.

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* Traité des Malad. des Enfants, par M. Underwood, etc., traduit par M. Eusebe de Salle. Discours Preliminaire, p. 45; Paris, 1823.

Etiology.—The predisposing causes of convulsions may be different, but they are all connected with the great irritability in the nervous system at the early period of life. This nervous sensibility is in excess at this age; and whatever be the disease with which the infant is affected, a morbid excitability and irregularity of action in the nervous system are more or less its attendant; and the muscles, the irritability of which is excited by the natural stimulant of nervous power, will, in by far the greatest number of acute diseases, exhibit an irregularity of involuntary motion, from a transient movement of the eyelids, fingers, and toes, to a general convulsion of the whole muscular system.

The excessive sensibility of the nervous system is often hereditary, and, like other affections that have been known to descend to the offspring, will affect the children of those who have themselves exhibited a like tendency to convulsive disorders. It has been remarked that the children of parents who are very young, or much advanced in years, have a strong disposition to convulsive diseases; so likewise are the children of dyspeptics, inebriates, or such as suffer much from anxiety and great depression of spirits. The climate, also, has a great tendency to impart a predisposition to these affections; and children in hot countries are much more liable to them than those of northern regions; a greater sensibility being observed in all the inhabitants of the torrid zone.

The natural state of increased vascular action in the brain, and the consequent excess of vitality, during its transition from the soft mass to its regular organization, also imparts a strong predisposition to irregular nervous action, when an excess of action occurs, or any circumstance arises to interrupt the regular process of gradual development.

Convulsions are either idiopathic or symptomatic; or such as proceed directly from the brain and spinal cord, and such as are brought on by indirect action on these nervous centres; the former are not so common as the latter, and usually arise from cerebral or spinal meningitis. Whatever be the form convulsions assume, whether spasms, cramps, or twitching, it was the opinion of M. Brachet that they all arose from an inflammation of the meninges.* Symptomatic convulsions are the most common met with among children, and, on this account they are rather to be regarded as symptoms of other diseases than as a disease; even in that form, dependant on the nervous centre itself, they would appear to be but evidences of the pre-existence of other affections, in that portion of the nervous system.

Violent blows on the head, or a concussion of the brain from falls, more especially from the landing on the feet when the limbs are kept extended, as is very common for children when jumping from a chair or any other height when in play, will produce severe concussion, and often convulsions of the most dangerous character. Some organic lesion, tumors, deposites of bony matter, and effusions, softening and other morbid alteration and deposites.

Among the causes which act directly on the brain and spinal cord, are almost every affection of childhood, which may thus become a cause of convulsion. Irritation in the primæ viæ, from whatever cause, is probably the most common. The retention of the meconium, undigested food, acidity, flatulence, worms, particularly the round and tape worm, are all frequent causes of this serious affection. Constipation is a frequent cause of convulsions, as was long since remarked by Hippocrates.† Young children who are habitually costive, have, after repeated attacks of this affection, ultimately died of convulsions.

The milk of the nurse, also, who indulges in spirituous potations, or who is affected with violent fits of passion, or who is herself troubled with disease, especially of the digestive organs, will often produce convulsions in children that are nursing. Numerous instances have occurred of sudden convulsions from a violent fit of anger. Loud noises, or sudden terror, will also cause convulsions; and in children that are old enough, the sight of others affected with them, or with other alarming diseases, will also produce them. So will any other cause that violently affects the nervous system, especially if it be sudden.

Convulsions are very common during the period of teething; the febrile action, with the increased flow of blood to the brain at this period, when the latter is in the active state, arising from the process of the organic changes, becomes an exciting cause of convulsive diseases.

The various exanthematous diseases, also, especially during their invasion, often bring on convulsions, particularly when, from the interruption of the natural order of their progress, an imperfect development occurs. The sudden suppression, also, of these disorders, will produce convulsions at any period during their course.

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* Brachet, Mem. sur les Causes des Convulsions, etc.; Paris, 1824.

† Aph. xxv., Sec. 3.

A most common cause is the drying up of cutaneous discharges. Such as those occurring behind the ears, tinea, crusta lactea, herpes, psora, etc., are frequently followed by convulsions, unless a free discharge from the bowels, either occurring spontaneously, or produced artificially, comes to the relief of the oppressed system.

Whatever causes an inordinate flow of blood to the head, may endanger the life of the child by the production of convulsions. Violent paroxysms, therefore, of hooping-cough, by crowding the brain, will at times produce them, and the excessive use of opiates in the same way will become an exciting cause of convulsions. Debility, and the absence of the natural stimulus to the brain, will also excite them.

Another cause is the action of emetics or drastic cathartics in some children. Protracted cases, also, have been caused by the persevering use of tartar emetic, as a nauseant. In sucking children, also, preparations of lead, which have been used for the purpose of washing inflamed nipples, have excited them. In short, any derangement of the system, from almost any source, will produce convulsive action in the muscles of infants and young children.

SEMEIOLOGY.—It is not usual for convulsions to occur suddenly, without any previous indication of such a tendency in the child. Among other precursors is restlessness during sleep, with occasional waking in terror. When awake, the eyes appear restless, and their expression is usually more brilliant than ordinary, and it is not an uncommon thing to see the child immediately before the paroxysm, especially if awaking from sleep, stare wildly about the apartment. Mr. North, who has written an excellent work on this subject, has described with great accuracy the premonitions of this affection. He speaks particularly of the fixed staring of the eyes, and the alternate contraction and dilatation of the pupils, a symptom of very common occurrence. A highly flushed face is also a very usual appearance preceding an attack of convulsions, and this may be looked for when it becomes suddenly red, accompanied by the expression of the eyes above mentioned. At times, a child will appear more than usually animated for a short period, but will quickly relapse inio a quiet and languid condition. Some children that are of a debilitated habit do not always exhibit a red or turgid condition of the face, but the countenance, on the contrary, is pinched, with some degree of lividity, especially about the mouth.

When convulsions occur, they may be either partial or general, affecting only a few of the muscles, especially about the face, or exhibiting the irregular action of the whole muscular system.

The action of the orbicular muscle of the mouth, and of some of the muscles moving the jaw, is not an uncommon occurrence, without the convulsive movement of any others. This appears to be connected with the presence of undigested food in the stomach, as I have seen it promptly removed on the occurrence of free vomiting.

It is most common, however, for all the voluntary and some of the involuntary muscles to be affected. At times the contraction and relaxation occur only on one side; and again they will alternate with the opposite, in regular succession. After a paroxysm, the child cries, and then falls into a profound sleep. The paroxysms are very liable to be renewed until the cause is removed.

It is of the greatest practical importance to ascertain the cause of this affection by the symptoms it presents; whether it is idiopathic or symptomatic. An idiopathic affection of the brain gives of itself no diagnostic symptom, but the history of the case will enable the practitioner to judge with a sufficient degree of correctness for every practical purpose. A blow, fall, concussion, or the existence of cerebritis or of hydrocephalus, will sufficiently point out the convulsive disease as having its origin in the nervous centre.

When, however, the convulsions arise from a disordered condition of any of the organs which can transmit an irritating influence to the source of the motor power, the state of the primarily affected part will, in general, point it out. The gums, for instance, in teething children, will usually be found hot and swelled, and the membrane lining the mouth in a state of greater or less inflammation. A restlessness, attempts to relieve present distress by putting the fingers in the mouth, a disposition to bite and press the gums—all which a watchful nurse will notice as having taken place previous to the existence of the convulsive attack,—will indicate, with the evidence afforded by the age of the child, with sufficient clearness the existence of dentition as a cause.

Again, if convulsions appear shortly after a full meal or after eating some highly indigestible substance, as the pulp of orange, raisins, nuts, fresh muffins, the fat of meat, or after eating cherries, the pits of which may have been swallowed, there is every reasonable presumption that the origin of the affection is from the presence of these irritating matters in the stomach.

Sometimes, when the cause exists in the stomach itself, the disease does not arise from the immediate effect of inappropriate aliment, but from the presence of accumulations from imperfect digestion. This will occur in children at all ages; and in the sucking infant from the formation of a mass of caseous matter out of the milk. This condition may be suspected when there has been frequent nausea, and occasional vomiting. One remarkable symptom in this state of the stomach is the constant moving of the jaw and lips, causing some degree of grimace; all these are connected with a loss of appetite, of sprightliness, and of sleep.

If there exist any inflammation of the stomach, uneasiness and even pain will be experienced on pressing the epigastrium. If such symptoms precede an attack, it may with every reason be presumed that the cause is from gastric accumulations, especially after the child has passed the time of dentition.

In irritations of the bowels of an inflammatory character, there is a tenderness of the abdomen, with an increase of the natural heat of its surface; the urine is scanty, and high-colored; the face is pale and contracted, and, in severe cases, the mouth is partly open, with a retraction of the commissures, imparting a peculiar expression, only to be found in inflammatory affections of the bowels. n

Convulsions may sometimes arise simply from the presence of gas in the bowels, usually in the large intestines; the presence of air may be ascertained by percussion performed on all parts of the abdomen. A sonorous sound will be heard, which, with the previous symptoms, such as constipation, or colic pain, will sufficiently indicate the source of the convulsions.

The signs of the presence of worms are somewhat difficult to ascertain; they may, however, be considered in general as follows: mucous or stringy stools, of a white color and fetid odor; pains and tumefaction of the abdomen; disturbed sleep; involuntary startings of the limbs; terror, easily excited; loss of appetite, with a sudden change to craving for food; dry and frequent cough; itching of the nose; swelling of the upper lip; abundant and limpid urine.

Other diseases affecting the proper movements of the muscles; and arising from the same causes, are very common in infants; such as clonic spasms, including the carpo-pedal spasm and tetanus. The former often occurs during the period of teething; the latter, at an earlier period of life, and generally prevails within the tropics. Cullen, however, mentions that it has been seen in the Highlands of Scotland, but never in the Low Countries.

Carpo-pedal spasm, as its name indicates, is characterized by a spasmodic affection of the flexor muscles of the hands and feet. The thumb is rigidly contracted into the flat of the hand, and the wrist, also, is drawn inward; the toes, from the same cause, are drawn downward, and bent under the foot. A spasmodic affection at the same time occurs in the larynx and chest, whereby a crowing or croupy sound is imparted to the respiration; it is evidently therefore connected with a similar morbid state of the nerves, which produces some cases of the spasmodic variety of croup. This form of the disease was first described by Dr. Clark, of Dublin.*

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* Commentaries on the Diseases of Children; Dublin, 1815.

Several interesting accounts of the disease have been given by Dr. Kellie and Dr. North.* Dr. Johnson has also published some valuable remarks on this subject.† As this form of convulsive affection depends on the causes already detailed, and as it has already been considered when treating on spasmodic croup, it is unnecessary to give them more at length; the reader may therefore consult the section on croup for a further description of the disease.

The prognosis is generally uncertain while the paroxysm continues; for although the cause may be apparent, and perhaps easily removed, yet it is not in our power to ascertain the precise extent of the pathological condition of the brain and spinal marrow. When quickly removed, we may generally consider it as favorable. When arising from any injury, convulsions are justly regarded as indicating great danger.

MORBID ANATOMY AND PATHOLOGY.—Dissections exhibit a great difference in the appearance of the brain and spinal marrow, depending on the exciting cause of the disease. In some instances there have been discovered tubercles and other organic changes; while in others a simple vascular turgescence, with a greater or less degree of effusion in the ventricles. Inflammation of the membrane of the brain and spinal meninges is also frequently found in children that have died from convulsions. M. Billard,‡ from a number of autopsical examinations, is of opinion, that the convulsions of children arise, in the greatest number of instances, from inflammation of the spinal meninges, particularly in the part near the base of the brain. He thinks, also, that an irritation in the seat of the affection may manifest itself before inflammation is produced, which it would be difficult or impossible to detect on dissection. If this irritation produce convulsions which are quickly fatal, it is evident that no organic change would be found.

This condition sometimes exists; and the nervous centre has also been in a state the very opposite of vascular congestion or inflammation. Convulsions may therefore arise from the irritation produced by the loaded and inflamed condition of the brain and spinal marrow, and likewise from the want of this natural stimulant. Excessive hemorrhage will not unfrequently produce convulsions; and bleeding as a remedial measure, when carried to the extreme, is often followed by convulsions in young children. Whatever, therefore, disturbs the action of the nervous energy will produce convulsive action, whether this arise from an excessive stimulation of the part, or a diminished action from congestion or exhaustion.

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* On the Convulsions of Infants; Lond., 1826.
† Med. Chir. Review, vol. iii., 1817.
‡ Op. Cit., p. 477.

As is evident from the numerous causes of this affection, convulsions are not always produced by a primary irritation of the brain or spinal marrow, and the morbid cause disturbing the regular nervous action often exists in a distant part, more particularly in the stomach and intestines; the irritation is therefore transmitted through the medium of the nerves to the centre of the motor system—the spinal cord. From this fact we see the cause of the frequent occurrence of convulsions among children, where the ingesta are generally greater than the requirements of the body. From the extreme irritability, also, of the nerves, any irritating cause existing in the bowels, whether it be the meconium, worms, or hard, undigestible substances, will become a cause of this affection. I once had a case of a child about four years of age, who obtained no relief from the most severe convulsions, until a copious discharge was obtained from the bowels, when a large number of cherry-pits were evacuated. Constipation, also, has terminated in convulsions, and ultimately in death.* That it is not necessarily connected with the brain is evident from the fact, that some children, when suffering from severe convulsions, will remain in possession of all their perceptive faculties. Instances of this I have occasionally seen, and they generally occur when the convulsive movements are partial. In one instance, however, which lately came under my observation, in a child of ten years, the affection of the muscular system appeared to be universal, and lasted for six hours with great severity; the eyes were fixed obliquely. On his recovery he spoke of the perfect possession of his mental powers, and described the measures which had been adopted for his relief, although unable to articulate during the paroxysm.

The two varieties of convulsive diseases have already been referred to, when treating of the causes of these affections. Their division into idiopathic, or such as arise from a disorder primarily seated in the spinal cord or brain, and such as originate in a remote organ, and conveyed to the spinal centre, and thence transmitted by a reflex action to the muscles, are, on account of their direct practical utility, facts of great value.

There can exist no doubt, since the clear and satisfactory experiments of Müller, and Dr. Marshall Hall, and especially of the latter, that muscular action depends on nervous power from a distinct system, the centre of which is the medulla spinalis, separate from the voluntary and sentient system, which has its seat in the cerebrum. A spinal or motor system acts in two directions, incident and reflex—the one proceeding from the nervous centre, and the other toward it. There is still some connexion between the nerves of the excito-motor system, since they are compound nerves, and have a cerebral as well as a spinal origin.

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* Morgagni, Epist. 31.

Idiopathic convulsions, whatever be the precise anatomical changes discovered on dissection, arise from the direct irritation of the spinal cord itself, or of the cranial portion which is exposed to the irritation or stimulus produced by their affections. Cerebral congestion, concussion, effusion, or compression, from whatever cause, will, also, by acting in the same manner on the upper portion of the centre of the motor system, produce spasmodic or convulsive action. The action of this cause appears in the last stage of hydrocephalus, convulsions invariably, to a greater or less extent, arising after the effusion has for some time taken place, while at the commencement of the disease no such affections exist, but with the increasing inflammation, congestion of the brain, stupor, loss of consciousness and voluntary power, are the most strongly-marked symptoms.

The most common variety of convulsions in children, is that produced by the irritation of the expanded filaments of the incident nerves distributed to certain organs, and conveying the stimulus they receive to the spinal cord, and its reflexion by the motor nerves to the muscles they supply—an eccentric cause—a term adopted by Dr. Hall in opposition to centric, in which the seat is originally in the nervous centre, producing the first-mentioned form of convulsions.

The excitor nerves, distributed over the gums, are, during the period of dentition, in a state of irritation from the swelling and inflammation existing there; so likewise the nerves of the mucous surface of the stomach and intestines in an overloaded state of the former, or costiveness in the latter, will convey the stimulating impression they receive to the spinal column, and thence to the extremities of the reflex nerves, producing every grade and variety of convulsion and spasm: the faint smile so frequently observed in the sleeping infant, the slight strabismus, rolling of the eyes, grinding of the teeth, twitching, startings, changes of the secretions, and finally, general convulsions.

Treatment.—For the proper management of convulsions, it is obvious that the cause should at first be ascertained and removed. It is therefore of the greatest importance that correct information be obtained, if possible, as to the general condition of the child, and the circumstances connected with the invasion. Sometimes it will occur immediately after eating, and depends on the food irritating the stomach, which ought to be immediately removed by an emetic, if it be possible to administer one. In the majority of instances the child is unable to swallow; and any attempt to give medicine by the mouth only aggravates the disease, by the obstruction it produces in the respiration, and the strangulation it causes. Where it is evident that indigestible food has been recently eaten, and an intermission occurs sufficient to give the medicine, a gentle emetic of ipecacuanha ought to be given as the least irritating, the object being simply the evacuation of the stomach. The syrup of ipecacuanha for young infants, or tartar emetic combined with powdered ipecacuanha for older children, will be sufficient to accomplish this object.

During the paroxysm it is often impossible to give an emetic; under such circumstances, and whenever there is any reason for believing the existence of irritating matter in the bowels, a common enema should be given. An enema not only evacuates the bowels of accumulated feces, but has a quieting effect in cases of convulsions, probably from its revulsive effects. In infants it may consist of a small quantity of olive or castor oil, with warm water. In older children, especially when the convulsions are attended with turgescence of the head, it may be made more stimulating, either by using a solution of common salt, or an infusion of senna. In very young infants it is often caused by the extrication of gas in the bowels; this may be suspected when the child has cried much, and given the usual evidences of colic pain. In addition to an enema, the abdomen may be gently rubbed with a little warm brandy or liniment on the hand, and as soon as the state of the child will admit, a cathartic must be given.

When the child can swallow, the most efficient medicine to act as a cathartic, is a full dose of calomel, which, if there be much febrile action, may be combined with ipecacuanha; the union of the latter with calomel, and given in small doses, so as not to act as an emetic, exerts an excellent effect in controlling and equalizing the circulation, while the operation of both on the glandular system generally, tends greatly to restore the functions of the various parts of the system.

It is usually the custom to immerse the child in a warm bath; where, however, there is much plethora, or a loaded state of the brain, the universal application of warmth seems to aggravate the symptoms. A partial warm bath, by immersing the legs in warm water, appears to afford more relief by the revulsion it occasions, especially if the head and spine be at the same time covered with cloths dipped in cold water. The feet and legs should always be immersed in a hot stimulating bath, prepared with cayenne pepper or mustard; a powerful revulsion will thus be made on a part distant from the seat of the affection. Under all circumstances the gums should be examined, and if evidences exist of the pressure of the teeth on the gums, they ought to be liberated by making a free incision.

In children of a full, robust habit, if the paroxysms be not quickly relieved by the measures above-mentioned, it will be necessary to draw blood from a vein in the arm. In such habits it often happens that other measures will have but a very imperfect effect until a little blood is drawn; a cathartic or an emetic having scarcely any operation until the pressure on the nervous centre is removed. This may often be accomplished in infants by the application of a few leeches behind the ears.

In idiopathic convulsions, such as arise from cerebral or spinal inflammation, and especially if it is clearly the result of injuries from blows or falls, bleeding is of the utmost importance, and should be regarded as the principal remedy on the establishment of reactions.

Sometimes the convulsions will continue unabated, or return after short intervals of rest, with as much violence as ever, even after all the remedies which were indicated by the peculiar condition of the child, at the time of the attack, had been used. The gums may have been freely cut; other remedies may have been fully applied, emetics and cathartics, or enemata, have actively operated with but little abatement of the symptoms. Under such circumstances, where a child has been bled, I have not hesitated applying a blister to the neck, of an oblong shape, so as to extend a short distance down the spine. As there is but little time for the use of remedies, and as everything must be done with promptness, the blister ought to be drawn with strong aqua ammoniæ, by means of a flannel soaked with it and applied to the part, and there held with the hand. But a few minutes will be required to produce a perfect vesication, upon the establishment of which I have seen all the untoward symptoms permanently disappear.

It was remarked that convulsions may arise from two opposite conditions of system; it would therefore be obviously improper to resort to bleeding in every case, even when they are protracted for a long time after the apparent cause is removed. When any doubt exists as to the state of the system, the condition of the fontanelle will point out the state of the brain. When the former is convex, there can be no question as to the plethoric or congestive condition of the brain. The depressed or hollow state of this opening, on the contrary, indicates a deficiency of fluids, and requires an opposite course of treatment, or rather the avoidance of a direct sanguinary depletion. This state is connected with other evidences of debility, and want of the proper and healthy quantity of fluids, as appears from the pale and wasted condition of the body, first pointed out, I believe, by Dr. Locock. Whatever be the temporary condition of the face, having the marks of vascular turgescence during the immediate paroxysm, if a permanent con-cavity exists in the fontanelle, bleeding must not be resorted to for the removal of the convulsions.

In this condition of system, and also, after the necessary depletion in that arising from increased vascular action or turgescence, when the convulsions are kept up by a morbid irritability engendered in the system, it will be necessary to resort to such measures as will calm the disturbance of the nervous system. Antispasmodics, however, ought never to be used until the supposed causes on which the convulsions depend are removed. After the bowels have been relieved, and such other means adopted as the case requires, to remove every probable cause of the disease, antispasmodics and composing medicines may be very properly adopted.

Among the best articles of this class, is assafœtida, which may very properly be given in an enema, especially in such cases as depend on intestinal irritation as the primary cause. From six to eight grains may be blended with an infusion of flaxseed for a young infant, or a scruple to half a drachm for a child two or three years old, to be repeated according to the necessity of the case.

Musk is another very powerful agent in controlling the morbid irritability of the nervous system, when it is connected with debility; it appears also to be particularly beneficial when convulsions depend on the sympathetic irritation. Its benefits are obvious, in proportion to the absence of sanguineous fulness. It may be given in the dose of half a grain to two grains every hour to young infants, or when there is much prostration, in the subjoined forms.*

Those medicines, also, which act from their narcotic powers, are also useful in allaying the excessive nervous irritability. Opium, however, is objectionable, from its effects in arresting the secretions. Hyoscyamus possesses properties analogous to opium, and from its tendency to promote the intestinal secretions, and to allay morbid irritation after its immediate narcotic influence has ceased, is well adapted for children. It may be given in the dose of a quarter of a grain to sucking children, and from two to five grains to children from four to seven years of age. When there exists any febrile heat, it may be given with ipecacuanha or James's powder. If, on the contrary, the most prominent symptoms be those of debility, hyoscyamus may be used with some stimulant, as valerian.† It has also been used in infantile convulsions, combined with calomel, in obstinate cases, where it evidently depends on the primary irritation of the gastric mucous membrane. It has been employed in France, in the dose of a grain and a half every half hour, with two grains of calomel every two hours, to a child two years of age.

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* ℞ Moschi, qr. vi.
Ammon. Sub. Carb., gr. iv.
Sacchar. Albi, ʒiij.
Aquæ, ℥iss. M.
A teaspoonful every hour, to an infant.

℞ Moschi, gr. iij.
Tere cum
Aquæ Anisi., ʒvi. Adde
Spts. Ammon. Fœtid., ℈j.
Syrup. Simpl. ℥j. M.
A teaspoonful every hour, to an infant of six months.

† ℞ Ext. Hyoscyam., gr. v.
Tinct. Valerianæ, C. gtt. xx.
Syrup. Simplicis, ℥ss.
Aquæ Cinnamon., ℥ss. M.
A teaspoonful may be given every hour, to a child from six months to a year.

In cases of frequently recurring convulsions, attended with great debility and emaciation, it will become necessary to have recourse to some direct tonic, as the carbonate of iron, in the dose of five grains to a scruple, to a child five or six years of age. The phosphate is also a useful preparation, and may be given in similar doses.

Stimulating applications to the spine are often of great efficacy in protracted cases of convulsions. Benefit is often derived, also, from the employment of such as possess some direct antispasmodic properties, as the oil of amber, applied with a piece of flannel to the whole course of the spine.

Convulsions in children being so often connected with a deranged state of the primæ viæ, a close attention to the state of the stomach and bowels is necessary, where the child is predisposed to these affections; in preventing a costive condition, by the occasional use of laxative medicine and enemata; in regulating the secretions by the judicious use of blue pill and ipecacuanha, where the whiteness of the stools indicates a deficiency in the biliary secretion; but more especially in the supply of suitable nourishment, according to the age of the child. A change of diet, about the age of two years, will often effect more than medicine, where the child has been too exclusively fed on pap. Chicken broth, and animal food generally, should be adopted, where convulsions persist under such circumstances; a marked alteration will appear in the health of the child.

CHOREA.

Chorea is a disease characterized by the irregular action of the muscles arising from the incomplete control exercised by the will over them; hence voluntary action becomes imperfect, and the muscular motions are rendered irregular and uncertain. An affection exhibiting every symptom of chorea was described by the ancients with great accuracy, at least so far as the lower extremities were concerned; from the irregular motions of which it took its name. In later times it has received the name now usually adopted, which is derived from the Greek, and signifies a company of dancers. It was in Germany that the appellation of St. Vitus's dance was first applied to this affection, from the tradition that this saint was a sufferer from the disease. A chapel was dedicated at Ulm, in Souabia, where such as were afflicted with this disorder repaired, and offered their vows and prayers for relief. The name of St.

Vitus has therefore been added to the other appellation, and it has by some nosologists been distinguished by the title of Chorea Sancti Viti.

Etiology.—The predisposition is found in the age of the patient, and it chiefly occurs between the ages of eight and fourteen, especially in those who are debilitated from sedentary habits; although it rarely appears after puberty, yet it has occurred at every age in those in whom the constitution is feeble and the general health impaired. Whatever produces a morbid irritability of the nervous system, predisposes to this disease, such as impure air, imperfect diet, excitement of the nervous system from the inordinate and premature exercise of the intellectual faculties.

Climate appears to have some influence on the predisposition; for it is rare in southern regions, and in some parts of the West Indies it has never been seen. The greater susceptibility of the nervous system in females renders them much more liable to this affection than males. Of an aggregate of one hundred and seventy-four cases, reported in various medical journals, one hundred and twenty-two were girls, and fifty-two boys. Dr. Elliotson states, as the result of his experience, that the proportion is as three to one.

Among the occasional causes is found terror or fright; several cases are reported as arising from these causes. Imitation, also, has produced chorea. Wounds and injuries on the head have likewise been followed by this affection. The various disorders of children have at times preceded chorea; among these are teething and suppressed eruption. The retarded appearance of the catamenia is also a very common cause. The most common, however, is gastric or intestinal irritation from worms, or disordered secretion or constipation; all which are of very common occurrence before puberty. There can be but little difficulty in distinguishing this disease from paralysis or convulsions. As to paralysis, the only form which may be mistaken for chorea, is paralysis agitans; but this affection occurs in advanced life, and is more partial in its extent, while the peculiarly ludicrous character of chorea is absent. The muscular movements of convulsions are much more violent, and are in every respect involuntary.

It is rare that this disease terminates unfavorably, unless some other affection, as epilepsy, paralysis, or effusion in the cavities of the brain occurs; therefore the prognosis may in general be favorable. It has been remarked that when the muscles of one arm or of the head are affected, the disease is likely to be much more protracted, than when the disorder is more general.

Semeiology.—The first symptom shows itself in the inability to control the motions of the arms or legs; usually the limbs of one side exhibit the convulsive movements which mark the disease. The child is observed to halt or stumble in walking, or to twist the foot of the affected limb awkwardly on attempting to place it to the ground. When it appears in the hand or arm, the same awkward motions are noticed, together with a total inability to retain the member in the situation in which it is placed. These are particularly observed to occur when the child's motions are watched, when they often become quite ludicrous. The hand is more than usually unsteady, whenever the child wishes to preserve its proper motions; as in carrying a glass of water to the mouth. All these involuntary motions increase until, in the most aggravated forms, all the actions are performed by jerks; the walking by a species of jumps or starts, while those of the arms are equally unsteady. At times the limbs have the appearance of being paralyzed, especially the lower extremities. When the disease is much aggravated, it affects many of the muscles about the face, producing grimaces; the lower jaw, tongue, and muscles used in deglutition, become implicated; the latter at times to such an extent as to interfere with swallowing. The irregular movements of these muscles give often a very ludicrous expression to the face. During the progress of the affection those muscles which were originally deranged in their functions, continue so during the whole of the disease.

The symptoms which characterize chorea are in general suspended during sleep; in very severe cases, however, they continue during the period of sleep, as well as during the hours of wakefulness. Great irritability of mind follows long-continued chorea, succeeded by hysterical capriciousness of temper and fatuity. Epilepsy and hemiplegia not unfrequently follow severe and protracted cases. These latter symptoms are most likely to occur about the period of puberty; so are also the complications of rheumatic affections of the muscles, especially those of the spine.

In very severe cases it appears to affect all the voluntary muscles; and the distortion of the face and protrusion of the tongue impart a ludicrous and sometimes a distressing appearance to the countenance.

Morbid Anatomy and Pathology.—Effusion has been found in the ventricles of the brain, with the appearance of turgescence or chronic inflammation;* in other instances tumors have been seen in the cerebrum. Dr. Hawkins discovered no lesion in the brain in a fatal case examined by him, but the source of irritation appeared in some of the abdominal and thoracic viscera.† It has been supposed by Dr. Clutterbuck and others, that inflammation existed in the brain. Chorea has also been referred to a hypertrophied state of that organ and of the spinal marrow, and likewise to a hardened condition of the anterior portion of the latter. In some cases of dissection, ecchymosis of the inverting membranes, a pulpy degeneration of the medulla spinalis, and the formation of bony plates, have been found. Various other pathological states have been discovered, such as morbid conditions of the uterus, mesentery, liver, etc., while nothing indicating disease of the brain or medulla spinalis existed. M. Serres also mentions cases where no morbid condition could be found in the brain, while in others there was sanguineous effusion in the corpora quadrigemina, in another, a tumor pressing on that part, and in two cases, an inflammation of that part.*

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* Dr. Coxe's Med. and Phys. Jour., vols. xiii. and xviii.

† Lond. Med. and Phys. Journal, vol. xvii.

Dr. Coxe is of opinion that it arises from hydrocephalus, or the inflammation which precedes this disease. It appears to be often connected with it either as a cause or effect; but it is difficult to ascertain from dissection which is the primary affection. It is not necessary that lesions should always at first exist in any part of the cerebro-spinal system to produce this affection; for, like other diseases of a similar nature, it may have its cause in some remote organ, and, when once excited, it may often be kept up by habit, even after the cause is removed. A morbid susceptibility, it is obvious, often exists in the nervous system, whereby an emotion of the mind will be productive of irregular muscular action; it can hardly be supposed that under such circumstances there can exist any appreciable vascular turgescence.

TREATMENT.—As the disease is so varied in its cause, the treatment must consequently have strict reference to its origin, if this can be discovered. In order to commence the treatment of chorea, the peculiar condition of the system must be studied, for upon an early discovery of the most prominent derangements and their successful management, often rest the whole result of the case. This is peculiarly applicable to the disease in question, which has its origin in conditions of the body so variable as to render the practice in too many instances almost empirical, judging from the vast variety and opposite nature of the remedies used. It is this different state of the system that has given rise to the employment of a great variety of remedies of the dissimilar character, found in every day's experience. The points to ascertain in the first place are, whether there are present any irritation, inflammation, or congestion of the spine as an idiopathic affection, and in the second, if there be any disorder in the primæ viæ, which, it is so well known, causes by a reflex action, an irregular motion of the spinal nerves.

At an early period of this disease in some cases, there may be found various evidences of inflammation or congestion of the brain and spinal column, manifested by pain in the head, with heat and throbbing of the carotid and temporal arteries, or a tenderness of the neck and spine upon pressure. Very frequently an unusual irritability or excitement of the mind is present, pointing out cerebral action of an inordinate degree. In such cases, especially where there is a tension of the pulse, a small quantity of blood may be abstracted by means of leeches: such a measure, however, requires great caution, and the physician should be satisfied from the incompressibility of the pulse, that it is absolutely required before it is adopted; otherwise great and irremediable injury may be the result. Where there is any doubt, it is the safest course to avoid the use of blood-letting in any form. Rest, quietude, and freedom from all mental excitement and study, must be strictly enforced. The diet should be free from any stimulating quality, and the use of tea, coffee, and exciting condiments, ought to be altogether prohibited.

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* M. Serres, London Lancet, vol. xiii.

In by far the greatest number of instances, there is at the commencement a great disorder of the primæ viæ, and the judicious use of purgative remedies will be found of vast importance, either to remove the original cause of this affection, or to prepare the system for the administration of another description of remedies. The use of purgatives formed the principal method of treatment with Sydenham, and was revived by Dr. Hamilton, and is the principal measure used by Cheyne, Guersent, and Chapman. Aloes, senna, calomel, and scamony, are the purgatives which have been the most employed in the treatment of chorea; all these are applicable to different states of the chylopoetic organs. Purgatives may often be advantageously combined with antispasmodics, such as valerian, assafœtida, etc. For ordinary cases, a dose of calomel, followed by castor oil, which may be repeated every few days, will be needed. To judge of the necessity of the repetition of calomel, the evacuations ought to be carefully inspected, and so long as they continue unusually offensive, and are accompanied by scybala, the calomel should be repeated. In the use of further purgatives, reference must be had to their effects on the muscular system, and to the costive habit of the patient. Milder purgatives ought then to be employed, and if there is much debility and loss of appetite, may be advantageously combined with a tonic, as gentian and senna in infusion. The safest plan, after the first impression is produced by calomel, is to combine, as before stated, purgatives with antispasmodics. Spirits of turpentine, combined with olive oil, will be a good purgative when there are worms present in the intestines. It is by no means necessary to persevere with powerful and active purging, even where the furred tongue, offensive breath, and other symptoms, point out the primary irritation to be in the intestines; mild aperients will often be all that is needed to remove the cause of the disease in delicate patients, the operation of active purgatives often adding to the existing distress.

When connected with a disordered condition of the secretions of the abdominal viscera, it is always found in pale, debilitated and irritable subjects. It will, therefore, often become necessary to have recourse to tonics to invigorate the body, and thereby diminish the nervous susceptibility, where the condition of the mucous membrane does not counter-indicate their use. The metallic tonics especially have been the most extensively employed, and found more successful than those from the vegetable kingdom. Among the remedies of this nature, the sub-carbonate of iron has been the most successful, in doses of from five to twenty grains. It is usual to prescribe it with some aromatic.* Other preparations of iron have also been used in chorea; the sulphate, in doses of three or four grains, to children eight or ten years old. Zinc, also, in the form of oxyde and sulphate, has been prescribed with great advantage in this disease; the former, from two to five grains, and the latter, from one to three grains, to children between four and eight years. Dr. Francis has been eminently successful with the hydro-ferro-cyanuret of zinc in the dose of one to two grains, in the form of pills, two or three times a day. This may be occasionally blended with the twelfth of a grain of strychnine. The nitrate of silver has been used with benefit in obstinate cases of chorea, connected with a disordered condition of the digestive organs. Arsenic has also been found efficacious in adults, where tonics are indicated; but from the powerful impression it makes, and the rapid absorption in children, I am inclined to think it a hazardous remedy.

Iodine has lately been used with great success by Dr. Peltz† and others; the dose and manner of its exhibition will be found under the head of scrofulous diseases.

Narcotics and antispasmodics have also, at times, been attended with good effect, when the disease has been kept up by habit, connected with a morbid sensibility of the nervous system, independent of any local cause. Belladonna, opium, camphor, valerian, musk, and other medicines of this class, have been used for this purpose. A combination of the extract of henbane and camphor has been employed with success by Dr. Bright.

In long-continued cases I have used electricity, but with no advantage; it has, however, in the hands of others, been successful.

1 to 2 grs. H. F. C. of Zinc
1/12 gr. Strychnine

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* ℞ Ferri Sub-carb., gr. x.
Pulv. Valerianæ, gr. xx.
Syrup. Zingiber., q. s. M.
ft. bolus.
For a child of ten or twelve years.

† N. A. Med. and Phys. Journal, vol. ii.

De Haen employed this agent with success, and found one of its effects to be an eruption resembling urticaria. Galvanism has also been used in protracted cases of chorea.

The shower-bath and cold bathing have been recommended, but in the high susceptibility of the nervous system in chorea, it must be regarded as rather too hazardous a measure for general use.

Various external irritants have been used to the spine, such as spirits of turpentine, tartar emetic ointment, blisters, setons, and issues, with no uniform effects.

Regular exercise in the open air, cold bathing, constant occupation, together with the tonic course above mentioned, and a residence in a dry and cool section of country, will, with ordinary precautions in removing the exciting cause of the disease, almost certainly effect a cure.

HYDROCEPHALUS.

This disease receives its name from the effusion of serous fluid in the ventricles and other cavities of the brain, occurring either suddenly or in a very gradual manner, and preceded either by a very marked acute inflammation, or by a chronic state of irritation in the arachnoid membrane. In the latter case it is often congenital, and may continue for a number of years; the skull separated at its sutures, being widely distended, and exhibiting an enormous increase in its size. It is therefore properly divided into acute and chronic.

ACUTE HYDROCEPHALUS.

This form of the disease has received the various synonyms of hydrocephalus internus, hydrencephalus, febris hydrocephalica, apoplexia hydrocephalica, eclampsia ab hydrocephalo, arachnitis, meningitis, dropsy of the brain, etc. The term at the head of this article appears to be the best, as it includes in its signification all the possible varieties, and is not adverse to the doctrine of previously-existing inflammation; while other terms, as arachnitis, or meningitis, can not be always applicable to the affection now under consideration, for the affections may not always terminate in effusion, which is the disease here considered.

It appears not to have been noticed as a distinct disease by Hippocrates and other ancient writers, although the father of medicine alludes to the existence of water in the brain—in a manner, however, that leaves a doubt whether he referred to an external or an internal accumulation of water. But both Hippocrates and Celsus, as well as other ancient authors, doubtless saw the disease, and there is no reason for believing that in their account of it, under precisely the same title as it is now described, ὑδροκεφαλον, they ever meant any other affection, although a question has been raised on the subject.*

In the year 1733, Mr. John Paisley published a clear account of this affection, occurring in a boy aged about six years, who was attacked with the usual symptoms of inflammation of the brain. The case terminated fatally, and, on examining the brain, a tumor presented itself, formed of the dura mater, enclosing a small quantity of serum. In the ventricles, also, there existed a large quantity of yellowish serum.†

The first complete essay, however, was published by Dr. Whytt, professor of medicine in the University of Edinburgh, in 1768,‡ in which a very accurate and philosophical account of the disease is given. This essay is replete with excellent practical remarks on the different appearances of the disease at different periods. The symptoms are accurately described, and its division into the very obvious distinction of different stages, shows the accuracy of the distinguished author's observations. The pathology of the disease is necessarily imperfect, and the treatment consequently not so energetic as that adopted at the present day.

The subject has received the attention of Fothergill, in England, Odier, in Switzerland, and our distinguished countryman, Dr. Rush. Of late years, Bricheteau, Cheyne, Yeats, and Coindet, have published excellent remarks on this subject. One of the most complete essays that has ever appeared, is that of Dr. Gòlis, of Vienna, a translation of which has been made into English by Dr. Gooch. Dr. Gòlis considers it as it was regarded by Dr. Quin, Dr. Rush, and others, as an inflammatory affection, and the effusion as the effect of this cephalitis; but, like them, does not extend his views to its frequent origin in the chylopoetic viscera.

ETIOLOGY.—Authors, generally, have remarked, that those children who have large heads are more predisposed to hydrocephalus than others, and that it occurs more frequently in children of great precocity of intellect. This, in itself, can scarcely be regarded as a necessary condition of the disease, although it not unfrequently has been found to co-exist with it. Those children who possess a quick sensibility, and who also give evidence of great excitability in the nervous system by irregular spasmodic movements, are evidently more predisposed to it than others.

One of the most common predisposing causes of this affection, which is one almost exclusively of infancy and childhood, is the growing condition of the brain, and the extreme activity of the blood-vessels from that cause. The brain, during the first periods of life, undergoes great organic modifications, and the exercise of its peculiar functions has also been remarkably developed; for it gradually acquires a control over the other organs, and becomes fitted to receive the impressions from them. It is on this account, as M. Billard observes, that during the early months of the child's existence there is but little excitement in the brain, it then undergoing nothing more than organic change; but as it becomes fitted to receive impressions, fever and inflammation ensue, often from very slight sympathetic irritation, as derangement from indigestible substances, dentition, so common in children; for acute hydrocephalus is not a disease of early infancy. The predisposition to cerebral disease is also hereditary, and it is not an unusual circumstance to see several individuals in the same family affected with it, as has been remarked by Cheyne, Coindet, Brachet, etc. Armstrong mentions the occurrence of hydrocephalus in four brothers, and Underwood, the death of six, at the age of two years. I have known of four deaths occurring in one family from this cause, successively arising as the children arrived at the age of two or three years.

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* Hippoc., De Morb., Lib. ii., sec. v. Celsus, De Med., Lib. iv., Cap. ii.

† Med. Essays; Edinburgh, vol. iii., p. 333.

‡ Obs. on Dropsy of the Brain, etc.; Edinburgh, 1768.

Dr. Percival has, by recording a number of cases, determined the age with considerable accuracy at which children are most disposed to hydrocephalus; and from his observations it appears that it most commonly occurs between the ages of two and seven years. M. Coindet, of Geneva, has, also, by means of tables of deaths kept for twenty years, ascertained the same facts. A similar result is also found in the tables of Dr. Emerson, of the deaths occurring in Philadelphia for twenty years, recorded in the first volume of the American Journal of the Medical Sciences; for, out of 1,602 cases of fatal hydrocephalus, 1,395 occurred before the fifth year, and between the ages of five and ten. These facts go to illustrate, in a remarkable manner, the influence of the increasing activity and sensibility of the brain in predisposing children to this affection in its acute form. Dr. Green states, that it is between the ages of five and seven that the greatest number of cases occur.*

It is said to prevail more in some countries than others. In England, France, and the United States, it is a frequent and fatal disease, while it is rarely to be seen in Holland, and Switzerland, according to the statements of Camper and Tissot.

The exciting causes are very numerous; indeed, there is scarcely any affection to which children are subject that may not become its occasional cause, while blows, or any injury or compression of the head, are also the agents of its production. The causes then divide themselves into direct and indirect, idiopathic and symptomatic. Blows and falls on the head are frequent exciting causes, as young children are much exposed to them from want of strength in supporting themselves while learning to walk; they often, however, thus experience injury, without any serious or lasting consequences resulting. The blows, therefore, ought to be sufficiently powerful to produce an inflammation of the meninges of the brain, from the violence of the concussion. Extreme heat is also another exciting cause, especially from the rays of the sun, whereby an inordinate flow of blood to the head is produced, terminating in inflammation of the arachnoid membrane.

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* Contribut. on the Path. of Children; Lancet, vol. ii., 1835.

The indirect causes may arise from various abnormal conditions of the system, and among these is that of suppressed eruptions, or of habitual discharges, such as that so common to children, the serous and puriform oozings from excoriations behind the ears. Among this class of causes are scarlet fever, measles, and other eruptive diseases; the former most frequently, when fatal, terminating in hydrocephalus. It has in these cases been supposed by many authors to arise from an interruption in the regular course of the disease, which has its proper periods of incubation, progress, and maturity; this irregularity being produced by the impression of the external air, as Bricheteau supposes. Whatever be the cause of the metastasis, nothing is more common than to see it follow cutaneous affections, and those sometimes of a very slight character, as the miliary eruption.

Intestinal irritation, or irritation of any of the digestive viscera, is also a very frequent cause of the disease in question; and authors ascribe it, in a great number of instances, to the sympathy existing between the various abdominal viscera and the encephalon. This strong tendency to cerebral inflammation, in diarrhœa, cholera infantum, and other diseases of the chylopoetic viscera, in infancy and childhood, is familiar to the most casual observer; and, indeed, is so frequent a termination of these affections, as to cause all diseases of the head to be referred by some physicians to the digestive canal as their sole origin. Among these more particularly are MM. Sabrioles* and Senn;† the former of whom has devoted an octavo volume of three hundred pages to the consideration of this subject; both regarding gastro-enteritis as the principal, and, indeed, the sole cause of these affections of the head. There can be no question of the strong tendency to diseases of the head in children, where there exists much disturbance of the bowels, and especially where there is any inflammatory action; both these affections often appear simultaneously, as is evident from the symptoms, which will be noted when that portion of the subject comes under consideration. These evidences of gastric and intestinal disturbance are important diagnostic signs of the nature of the exciting cause, and on which a successful treatment of the ordinary hydrocephalus very essentially depends; for the removal of any irritation from the bowels, whether it be worms, or acrid secretion, often is important in removing the first link in the chain. These views are not peculiar to the French physicians, but were long since entertained by Harris, and more recently more closely investigated and practically applied to the disease before us, by Drs. Cheyne and Yeats. In addition to the deranged condition of the alimentary canal, they considered the congested, sub-inflamed, or sluggish state of the liver, as the principal exciting cause of the common cerebral affections in children—views more in accordance with general experience and the practical benefits derived from them. This extended consideration of the subject, in leading the practitioner to anticipate the disease, when the symptoms of deranged action in this viscus are apparent, gives a high value to these treatises, and makes them important, as marking a new era in practice as relates to this disease.

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* Recherches d'Anatomie et de Phys. Pathol., etc., par G. Sabrioles; Paris, 1826.

† Recherches Anatomico-Pathologiques sur la meningitis; Paris, 1825.

The irritable state of the system during dentition is also a subject of common observation; and the excitement attendant on this state is an active agent in the production of hydrocephalus, both from the general febrile condition, as well as the inordinate determination of blood to the head, from the sympathy arising from contiguity of parts.

Violent paroxysms of coughing, crying, and even of anger, become exciting causes of inflammation of the membranes of the brain, terminating in effusion, by causing an excessive flow of blood to the cerebrum. In like manner, an inordinate use of the cradle has been found hazardous, from its producing similar effects, convulsions having, in some instances, been brought on by violent rocking. A moderate motion often has a soothing effect, and can not be regarded as hazardous; but the practice of continued and violent motion of the cradle, can not be too highly reprobated. As was just remarked, violent coughing is a prominent cause; to this, therefore, may be referred the effusions in the brain, so commonly following hooping-cough. But in addition to this cause, there is doubtless existing in all children a predisposition to cerebral disease; the simple excitement attendant on protracted hooping-cough is sufficient, in some instances, to cause the development of arachnitis.

All these facts unquestionably prove the predisposition to exist in the brain of children, from some peculiarity at this period of life, which exposes it to be excited by derangements existing in other parts of the system, by which it participates in common with others. But from excessive circulation in the brain, evident in the great size of the head of children in proportion to other organs, and its excitable condition, as appears from the extreme mobility of the nervous system, there can scarcely remain a doubt that this condition of development is what predisposes it to be so easily affected by derangements in the system generally, which excite preternatural action in the blood-vessels. Physiologists generally, from Stahl to Bichat, have noted particularly the condition of the cerebral organ, and have considered it as the predominant organ of the period of childhood; by which is probably meant the organ which, from its imperfect development, needs a large supply of blood to carry on the process which nature requires, and, therefore, circulation predominates in this viscus; for it can scarcely be regarded as a predominating organ, when its essential function of thought is but in imperfect action.

Semeiology.—The invasion of hydrocephalus is often like that of an ordinary fever arising from derangements of the abdominal viscera, and is marked by similar symptoms, such as colic pains, nausea, vomiting, and sometimes, as the disease advances, is accompanied by a diarrhœa of green discharges, showing an excess of biliary secretion. The sleep is disturbed, the child also waking as if alarmed. These symptoms may continue for several days, or even weeks, as was long since noticed by Dr. Whytt. At other times the invasion is sudden, but generally the progress of the disease is marked by a distinct set of symptoms; and authors, since the essay of Dr. Whytt, have generally admitted the existence of three stages of hydrocephalus. These divisions, although founded in nature, and highly useful in practice, will often be very irregular in their progress, and thus, at times, will render it difficult to assign with precision the symptoms which arise to their proper stage. A close watching of the symptoms may, notwithstanding, enable us to obtain a sufficiently accurate knowledge of the existing state of the disease. Dr. Cheyne and others have proposed modifications of the divisions of Dr. Whytt, founded, as it was intended, more on physiological principles; that of Cheyne is divided into the stages of excitement, torpor, and of convulsion, while Itard* makes two, the first of irritation, the second of compression.

The division of three stages, when considered as founded on the pathology of the disease, is the most practical, as having different causes for the production of their peculiar symptoms, and consequently requiring treatment appropriate to the removal of these causes.

The first is the stage of simple irritation, and may be known by the usual indications of an irritable state of the brain, as extreme wakefulness, starting and grinding the teeth when asleep, and suddenly awaking with a loud scream and the appearance of fright. There appears to be a sudden feeling of distress at times in the head, producing a violent cry, where both parts of the cry are acute and shrill, and described by M. Maunoir, and Coindet of Geneva, as peculiar to this disease, and designated by the name of "hydrencephalique." This condition often continues for four or five weeks, and even longer, and may often disappear without passing into the other stage. The excitement, however, attendant on indigestion, or irritation of any kind in the stomach and bowels, the invasion of any pulmonary disease, suppression of cutaneous eruption, habitual discharges, the sudden application of cold to the surface, or the continued irritation of teething, may increase the irritative action of the brain, until an inflammatory action has commenced in the meninges.

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* Dict. des Sciences Méd., Art. Hydrocephale Aigue.

Among other symptoms at this period, is the functional derangement of the stomach and bowels, such as indigestion, irregularity of appetite; with other instances of a deranged action in the digestive viscera, of a character the most opposite, such as constipation, and at times diarrhœa. Most commonly, however, the former exists. The liver gives evidence of derangement in its secretory function. At first, a great deficiency of bile exists; but as the disease advances, and the symptoms of inflammatory action become decided, an increase of secretion occurs, and free discharges of green bile take the place of the constipation.

Vomiting is a remarkable symptom, and whenever a sudden discharge of the contents of the stomach takes place, and continues after the administration of the usual remedies for the relief of such symptoms, mischief in the brain may be suspected. A remarkable characteristic of this vomiting is, that it appears to be unattended with nausea, or the usual appearances on the tongue, indicating an idiopathic affection of the stomach. Another characteristic of vomiting from this cause is, that it more frequently occurs when the patient is raised, rarely while recumbent. The obstinacy of the vomiting, and existence of headache in infants, may be suspected by their sharp cries; and, in older children, their complaints will sufficiently point out its nature. These symptoms of incipient hydrocephalus ought to be carefully ascertained; for upon a prompt discovery of the early stages of the disease, the successful treatment almost entirely depends.

The second, or inflammatory stage, is indicated by the increase of the symptoms above mentioned, and in very young infants may, by the careless observer, be like those of the first stage, rather ambiguous, if we except that of vomiting, and other derangements of the primæ viæ.

The tongue is generally white if the inflammation runs high, and is an idiopathic affection; if, however, it arises from sympathetic irritation, from a disordered or inflamed condition of the stomach and bowels, it becomes dry, and covered with a dark brown fur. There exist great restlessness, irritability, and an increased sensibility to the light, the eyelids being partially closed, and the brows contracted. The pain in the head is intense, and is more severe when the inflammation has been caused by a fall or a blow, and is a tolerably accurate indication of the degree of inflammation. The mechanical movement of the hands to the head will point out the seat of the pain, which is sometimes at the back part, sometimes at the front, or in the temples; and children will often keep their hands on the part, and not suffer them to be removed even for a moment. The pain and distress cause great restlessness, tossings, and continued wakefulness. These symptoms, however, are not always constant, but intermit, and are alternated with vomiting, and abdominal pains of a violent but transient character. The face for the most part is pale, but occasionally with a redness of one cheek.

It is in the period of inflammation that the cry above alluded to, as characteristic of the disease, becomes most peculiar and constant. M. Mathey* describes its peculiarity to consist in a piercing, prolonged sound, but without indicating violent pain. It is only found in acute hydrocephalus, and not in any other disease; and when taken in connexion with the altered state of the physiognomy, points out the condition of the brain connected with hydrocephalus, and is more expressive of a morbid distress or terror than of acute pain. Although children cry in every disease of an acute and painful nature, yet this fact does not diminish the importance of this diagnostic sign, as these cries are rather of an impatient or fretful character, and with a little attention may be distinguished from the peculiar sharp expression of suffering in hydrocephalus.

Delirium is not very frequent at the commencement of this stage, but almost always exists toward the latter part. It is not of a ferocious character, and the child, if old enough to understand and converse, is easily aroused.

The circulation in this stage is somewhat quickened, and the pulse is frequent and tense; the skin continues but little altered in temperature, which is something above the healthy standard, and destitute of moisture. The condition of the pulse, at different periods of the disease, has been very accurately noted by Dr. Whytt; but the extent to which he has carried his views renders them of little avail in practice.

Sighing is a constant and very remarkable symptom of the disease toward the termination of the inflammatory stage, and may be regarded as a very unfavorable one, as it commences immediately before the appearance of symptoms indicating the third, or stage of effusion.

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* Mém. sur l'Hydrocéphale, qui a remporte le Prix au Jugement de l'Academie de Dijon, le 4 Juiliet, 1818, p. 46.

The last, or stage of effusion, is that from which the disease has received its name, and at this advanced period may almost be regarded as incurable; hence the opinion of those who formerly wrote on it, Whytt, Fothergill, and others, that it is an incurable disease, from having only apparently recognised it in the last stage, without any knowledge of the inflammatory condition which preceded it, and upon the treatment of which the success almost entirely depends. In this stage the most prominent symptom is drowsiness, or a greater or less degree of stupor; indeed, it is an invariable attendant on the state of effusion. Its duration is various, and has even continued for the space of two weeks. When this is the case, it alternates with spasmodic affections and lucid intervals. At other times the attack of effusion is sudden, and has been well described by Dr. Gòlis under the significant name of *wasserschlag*, or water-stroke, from its sudden violence. Cases of this nature have been noticed by every practitioner of any experience.

When this stage comes on in its most usual manner, after a period of active and well-marked inflammation, confusion of mind shows itself at first, rather than violent delirium, accompanied with a peculiar expression of countenance, indicating a great derangement of the perceptive powers. The child is in a state of stupidity when aroused, which gradually becomes more difficult to effect, until he is at last completely comatose, and can not be made to manifest any consciousness. A perfect torpor ensues in the latter part of the disease in every organ of sense; the sight is entirely lost, and deafness becoming more and more profound, marks the progress of the compression on the origin of the nerves. The sense of feeling is the last which is lost, and, as might be supposed, where the effusion is in the brain alone, the lower extremities retain longest their power of motion.

In the early periods of the stage of effusion, the eyes give some very important signs of the progress of the disease. The conjunctiva is suffused with blood, and while the child sleeps, the eyes are turned upward. The state of the pupils is that which has most attracted the attention of physicians, for it is a clear indication of the progress of the effusion. They may be enlarged even in the early stages of hydrocephalus; but this condition is not permanent, and it is easy to discover whether it arises from a certain species of irritation alone, by placing a light before the eyes; the pupils will contract and immediately enlarge on the removal of the light.

Then, again, by leaving the light some time before the eyes, the pupils will alternately contract and dilate, from what appears to be a convulsive movement of the iris.

When, however, there exists effusion in the ventricles of the brain, the enlargement of the pupil is permanent, and the eye remains insensible to the light. This symptom is a fair indication of the existing condition of the brain; for it is more completely marked toward the close of the disease, when compression has destroyed the remains of sensibility. Strabismus is almost always a symptom of the disease; more commonly occurring, however, at the commencement of the effusion, and usually precedes paralysis or convulsions.

When a paralyzed condition of the muscles occurs, it is sometimes confined to one arm or one leg of the same side, or to the muscles that move the eye or elevate the palpebra. Before a permanent paralysis occurs, a throwing of the arm of one side, irregular movements of the muscles of the face of that side, and the apparent want of entire control over the motions, already show the existence of a partial paralysis. The paralysis comes on gradually, first showing itself as an apparent debility, until the power of moving the limb or limbs is entirely lost.

Convulsions almost invariably occur, to a greater or less extent, in hydrocephalus. Sometimes they are confined to one arm or leg, even when they have already suffered paralysis; or a simple spasmodic twitching of the muscles of the face, or an irregular rolling of the eyeballs may alone exist. At other times they are general, and exist toward the termination of the disease, and the child not unfrequently dies in a convulsive paroxysm.

In this stage the pulse is variable, according to the extent of pressure on the brain. If there is much drowsiness and stupor, it is slow and full; these symptoms not usually prevailing to a great degree at the commencement of the effusion. A remarkable quickness is observed in the pulse, which continues, if convulsions or partial paralysis take the place of the stupor, gradually becoming weaker, until its beatings are imperceptible.

Dr. Whytt has considered slowness of the pulse as a pathognomonic sign of effusion in the brain; but this is not always so, for it is found to differ in many patients, although dissection has revealed the existence of serum in the ventricles. The condition of the pulse will in general be found dependant on the extent of the pressure on the brain. Besides, in young children, the circulation appears to be so susceptible of changes and irregularities from very slight causes, that, as Harris has long since remarked, the condition of the pulse is not so perfectly to be relied on in them as in older children or adults.

The skin, at the commencement of this stage, is usually hot and burning; as it advances, a dripping moisture covers the whole surface of the body, and almost every other symptom of complete prostration exists, the child either dying in this state, or a violent paroxysm of convulsions closes the scene.

A peculiar condition of the system exists a short time before death, which all authors have mentioned, and which must have been noticed by every practitioner; it is that which produces an almost complete remission of the symptoms of oppression; and, in some instances, so complete is the relief, that the child will, from being insensible to all surrounding objects, become restored to the use of his sight, hearing, speech, etc. The relief is at times so great as to give the most flattering hopes of a favorable termination, that even the experienced physician can scarcely bring his mind to the belief that it is a deceitful brightening, preceding a more profound state of coma, invariably terminating in death.

This is the ordinary course of the invasion, progress, and termination of hydrocephalus; but it is not always that the disease observes such regularity in its progress; and when the effusion occurs suddenly, the precursory symptoms are very transient, or are absent altogether. Although there will always exist some evidences of ill health, the digestive organs being those which are observed to be the most deranged, and often in that variable condition so common in irritation of the gastro-intestinal mucous membrane, and with the itching of the nostrils, grinding of the teeth, that frequently attend this state of the stomach, yet there are cases where there scarcely appears to be any marks of disease whatever, either in the abdominal viscera or brain. Dr. Rush has recorded cases where there was not even pain in the head, and where the usual symptoms of nausea, dilated pupil, and strabismus, were absent.* There are others having no other precursory symptom than a catarrh. In such cases the urine appears to be passed with difficulty, in a very small quantity, and is described by M. Coindet as being farinaceous, or chalky. A drowsiness, with very slight febrile exacerbations, are the only symptoms of the disease under these circumstances.

As might be supposed, there are different degrees of severity in these symptoms, and a great variety in the appearances of the disease, arising from the different temperaments in the individuals affected. Thus, we may expect to find in one where the sanguineous temperament predominates, violent inflammatory symptoms, quick, hard pulse, violent headache, with occasional delirium; in one of a lymphatic temperament, a greater degree of stupor will exist from the commencement, accompanied with a slow pulse and with but little febrile action.

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* Med. Inq., vol. ii., p. 210.

The diagnosis of this disease is in some cases difficult; for almost all disorders of the bowels, as well as the irritation of teething, will produce symptoms bearing a close resemblance to those of hydrocephalus, such as coma, strabismus, spasms, startings in sleep, etc. These, however, are confined to the last stage; and when they are found without the usual premonition, an immediate attention to the condition of the bowels may relieve all the untoward symptoms, and enable us to make a correct diagnosis of the disease; for it not unfrequently happens that a free alvine evacuation, or a simple incision of the gums, will remove every symptom of cerebral disorder. n

Dr. Cheyne* considers the appearance of the alvine evacuations as affording a good diagnosis of the disease, when it is liable to be confounded with intermittent fever of young children. In the inflammation of the arachnoid membrane which precedes the condition constituting hydrocephalus, they are of a dark green color and slimy consistence. In the last-mentioned disease, also, as observed by Dr. Gòlis,† the abdomen is always in a collapsed or flattened state, while in the febrile affection just referred to, it is tense and swollen. In arachnitis the head is the hottest part; in the remittent febrile affection of children the abdomen is hot, while the head is comparatively cool. In this disease, also, or worm fever, as it is generally known and described by authors, the inner surface of the nose is moist, the smell is acute, and there is a great itching of the part; in acute hydrocephalus the discharge from the nose is stopped, and the patient gradually loses the sense of smell. In this disease, also, the eye is very sensible to the light during the inflammatory period, and perfectly insensible to it after the effusion has taken place. In the intermittent fever from gastric irritation, the patient never complains of a strong light, nor is there a state of insensibility to the light at the termination of the disease, nor does there exist any paralytic affection at the approach of death, as in the state of effusion in hydrocephalus. n

The work of Dr. Gòlis, a very excellent and practical monograph on the subject, is needlessly minute on the subject of the diagnosis of the disease, in making distinctions between the various affections of a febrile nature with which children are so often attacked, when, in reality, the symptoms are evidences of a similar condition of the cerebral meninges, generally ending in effusion. The detail of the shades of differences occurring in the diseases with which it is liable to be confounded, rather tends to perplex than assist the practitioner—a variety of symptoms depending on various occasional causes not unfrequently occurring in every disease, which, if always taken into account, to raise a doubt as to its identity, would indeed make the diagnosis in some instances a matter of complete uncertainty. Other writers, Itard, Bricheteau, etc., have also extended their investigations to a minuteness in giving the symptoms of other inflammatory affections of the brain, which can scarcely ever be applied to any practical use.

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* Op. Cit. † Op. Cit., p. 53.

Without, therefore, going further into a detail, it is sufficient for all practical purposes to know, that when children are old enough to describe their feelings, there are good grounds for suspecting the disease to be present when they complain of severe pain in the head, accompanied with frequent pulse and frequent vomiting, especially on being raised in bed. Even then, it is not always easy to decide whether the symptoms are those occurring in the first stage of the disease in question, or that with which it may be so easily confounded—the remittent fever of infants. In a practical point of view it is but of little moment; for if the symptoms of cerebral derangements in the last-mentioned disease are so violent as to create a doubt as to its precise nature, no injury can possibly result from an error in regarding them as directly *tending to the* effusion of serum, and adopting a vigorous course for the prevention of this almost certainly fatal termination of the disease; indeed, it is under these circumstances, nothing more than secondary or sympathetic hydrocephalus. In younger children, the physician may also have reason to suspect the existence of the forming stage of the disease, when they are observed to cry incessantly, pass a long time without sleep, and the usual symptoms of violent pain in the bowels, such as writhing and drawing up of the legs, are absent; when they have irregular alvine evacuations, vomiting, and a diminished quantity of urine.

Hydrocephalus is always to be regarded as a disease of the greatest danger, and, when arrived at the stage of effusion, is almost necessarily fatal. Thompson says he never saw a patient recover from it. Cheyne, Golis, and other writers, also bear testimony to the great mortality of the disease. Dr. Eberle states, that in the course of twenty years' practice, he never knew but two fully developed cases which terminated in health. In a great number of cases coming under my observation in the course of several years, I know of but one recovery where effusion had actually occurred, and this was a case where every hope of recovery had been abandoned, and where a sudden and very copious discharge of urine came to the entire relief of the patient. The prognosis is more favorable, other things being equal, in proportion to the early period of the appearance of the disease, at which it is subjected to medical treatment; and the earlier prompt and judicious remedies are applied, the more hope is there of recovery.

MORBID ANATOMY AND PATHOLOGY.—Authors have been very particular in recording every appearance of disease in the brain, on post-mortem examinations. On this account it is that the appearances have been described as very various; and while the effusion of serum has been regarded as its peculiarity, tubercles, cysts, suppurations, sanguineous effusions, adhesions, and other changes, have been carefully noted whenever they have occurred. M. Bricheteau considers this minuteness as an unnecessary accumulation of isolated facts, and that the record of the occasional departure of the disease from its strict nosological place, gives evidence of but little discernment in the various affections of the brain, in regarding them as essential to the disease in question, which in strictness is an accumulation of serum in the cavities. But it is clear, that in a practical point of view these facts are of the greatest importance; and in so far as pathology can clear up the mystery of disease, go much toward affording a correct knowledge of the nature of hydrocephalus, as they give unequivocal evidence of the existence of an inflammatory period, which, from dissection, could not be proved from simple effusion of serum.

The most common appearance, on dissection, is a quantity of serum in the lateral ventricles of the brain, varying in quantity from two to eight ounces; occasionally, however, the quantity has been found to be much greater, even to the extent of twenty-four ounces, according to M. Brachet, in the other ventricles and base of the brain. On other occasions but little or no serum is found in the ventricles, but between the membranes. It is a limpid fluid, resembling whey, and is not coagulable by heat like the effused serum of other cavities. Although usually clear and colorless, yet it is sometimes turbid and yellow, and occasionally mixed with albuminous flakes; at other times it is of a gelatinous consistence between the convolutions of the brain.

The substance of the brain, according to the dissections of Laënnec, Gòlis, Jadelot, and Bricheteau, is often of a firm consistence, and in some degree, as it were, hypertrophied; where this is the case, there is but little effusion in the cavities. In other instances there exist great disorganization and softening; this is more particularly the case where there has been a large quantity of effusion, by which the brain has been exposed to compression. In some, on the contrary, a part will be found completely indurated. Pus has also been found on the surface of the brain, of which Abercrombie has given two cases,* that followed the usual symptoms of hydrocephalus.

Besides effusion in the ventricles, and alterations in the consistency and organization of the brain, the pia mater and tunica arachnoidea, as well as the adjacent cellular tissue, are for the most part the seat of the usual marks of inflammation, such as sanguineous injections, or exudations of albuminous matter on their surface. The plexus choroides is always dark red, and in some instances enveloped in a thick coating of albumen.

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* Patholog. and Pract. Researches on Dis. of the Brain; Edinb., 1828.

The veins and sinuses of the brain also partake of the diseased alterations, for they are always found engorged and distended with blood.

In addition to these appearances of disease in the brain, the abdominal viscera show the existence of disease, which has, by sympathetic irritation, caused the cerebral affection. Brachet, Sabrioles, Senn, Cheyne, and Yeats, note particularly the inflammatory appearances of the intestines. The two latter, especially, have remarked the congested state of the liver. Some have strangely attributed these appearances in every instance to the excessive use of purgative medicines, when all the symptoms on the original invasion of the disease are sufficient proofs of the deranged state of these organs. It is frequently found that the mucous membrane of the intestines is in a state of inflammation; and, from the alterations in the calibre of some of the intestines, there exist the most undoubted proofs of a previous state of inflammation.

Among other conditions of the brain in this disease, which the investigations of modern pathologists have brought to light, is the presence of tubercles. These depositions of tuberculous matter, until within a few years, were scarcely suspected, although, in fact, according to the results of the dissections of Dr. Green, they occur in one fourth of the number of children dying of cerebral diseases.* It has indeed been long noticed, that children dying of hydrocephalus were mostly of a scrofulous temperament, and this condition has been shown to exist by the dissection of a number of cases by Dr. Mills;† but the positive proof of this affection being present in any of its forms, was unnoticed, until the subject was elucidated by the essays of MM. Mitivié, Giraud, Tornellé, Leviellé and Defour, in France, referred to by Dr. Green, in the essay above mentioned: it has also received much attention from Dr. Gerhard, of Philadelphia, in the American Journal of Medical Sciences.‡ The latter has drawn his cases, also, mostly from the Parisian hospitals, which are filled with patients who have suffered much from insufficient and bad nourishment, and also from impure air, a class of subjects where we might expect to find the effects of a degenerated condition of the fluids; and the inference which he appears to draw as to the nature of the disease called hydrocephalus acutus and meningitis, in regarding it as a tuberculous disease, is scarcely applicable to other cases of the disease. These tubercular deposites have often been found in children who have not manifested any cerebral disturbance during life, and have even attained a considerable size without producing any symptoms of inflammation; in other instances small tubercles have been discovered, evidently the cause of very great irritation and inflammation, effusion and death; proving them to be a cause of inflammation, and thus one of sources of serous effusion. In eighty cases collected by Dr. Green in the paper above mentioned, the maximum number of tubercular formations occurred between the ages of two and four years.

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* London Lancet, Loc. Cit.

† Trans. King and Queen's College, vol. v., p. 350.

‡ Vols. xiii. and xiv.

It is evident from the detail of the symptoms, and the appearances on dissection, that the effusion constituting the disease is a secondary affection from previous inflammation of the membranes of the brain, which itself is consecutive on affections of the abdominal viscera, except in those cases arising from some direct cause. The varying appearances on dissection prove this beyond a doubt, especially when considered in relation to the pathognomonic symptoms, which are clearly those of cephalitis, when observed before the final stage of effusion. These views were the opinions of our distinguished countryman, Rush, and of Henke, Stark, Sprengel, Gòlis, and others. From numerous dissections made by Gòlis, and still more recently by Billard, this inflammation, or meningitis, as it is termed by the last-mentioned author, appears under two forms, that of a simple inflammation, with nothing more than a vascular injection or spotted redness, with or without the formation of a pellicular concretion or false membrane. Under these circumstances, convulsions and violent cries are the symptoms that are the most common. The other form is that which marks the disease we are now considering, and known by the presence of serum or seropurulent fluid in the cavities of the brain. This state of the brain is known by the symptoms already described, and in the primary stages are those which are peculiar to simple inflammation of the meninges. These symptoms, it is true, are often very various as respects their duration, intensity, and exacerbations; but whatever be their varieties of form, their fundamental character always exists; and it will not be a difficult thing for the practitioner to detect the disease from the characteristic phenomena which inflammation of these membranes exhibits.

In those cases in which effusion appears to be very sudden, causing the immediate death of the patient, it has been thought by some that the suddenness of the effusion is only apparent. This variety has been known by the names of apoplexia hydrocephalica, hydrocephalus hyper-acutus, and described by Dr. Gòlis under the term of *water-stroke*, from the suddenness with which the symptoms appear. Dr. Gòlis describes it as passing through the stages of turgescence and inflammation, without giving the usual evidences of their existence, and that the stages of transudation and palsy, four stages being his division of the subject, are also confounded together, and can not accurately be distinguished. He has, notwithstanding this apparent absence of the periods of excitement, discovered upon dissection traces of turgescence and inflammation. The effused fluid was always found turbid, with much less coagulable lymph than in ordinary hydrocephalus; a circumstance which led him to the opinion that lymph was partly mixed with serum, and that the whole mass was the product of a morbid action of the vessels. The effusion, therefore, may have occurred slowly, and not have produced its peculiar effects until it had become abundant; such is the opinion of Billard, and appears to be supported by daily experience and by natural analogy.

TREATMENT.—In the treatment of this disease it is of the greatest importance to take into consideration the circumstances which have preceded and which accompany the attack, for the successful management of it depends not only on the early application of suitable remedies for present symptoms, but also on the nature of the exciting cause, for a prompt removal of this is our main dependance for the cure.

As the disease is naturally divided into idiopathic and symptomatic, an early inquiry into the immediate cause of the cerebral disorder in children, will enable us to apply the appropriate remedies, and at once use such means as are the best calculated to extinguish the disease before it has got its fatal hold. When its cause is one which has acted directly on the brain, such as exposure to excessive heat, falls, or blows on the head, or when the inflammation has been produced by obstructed perspiration, the indications are, 1st, to relieve the excited state of the blood-vessels of the brain; 2dly, to allay any general febrile excitement, by which the circulation in the brain is maintained in an excessive state of action; and 3dly, to produce such revultions as will create a permanent flux of blood from the affected part.

Nothing is so effectual for fulfilling the first indication as the prompt abstraction of blood from the arm, and the quantity taken should be sufficient to produce a decided effect on the general system. The pulse, in the state of active inflammation, is usually hard and frequent, and an impression on the force of the circulation by the drawing of blood is essential to the management of the case; indeed, there is nothing that can take the place of general bleeding, in a disease of so great danger as inflammation of the brain, and one which will not allow of the slightest waste of time in the use of other and comparatively trifling remedies. If it be not vanquished at the commencement, and the inflammatory action at once extinguished, there exists but little hope of carrying the disease to a successful termination; the march of inflammation in children is so rapid, the termination in effusion, where the inflammation is seated in the arachnoid membrane, so certain, that our only hope is to arrest the inflammation by the only efficient means above mentioned. To be the most effectual it ought to be performed at the commencement of the inflammatory symptoms, and carried to a sufficient extent to produce a disposition to syncope at first. When it is necessary to repeat the operation, some care will then be required in regulating the quantity to be taken, for serious and even fatal convulsions may ensue from incautiously carrying the loss of blood to the extent of producing a continued tendency to fainting in young children. On the recurrence, therefore, of re-action, the vein may be again opened, and it will generally be found that, compared with the first bleeding, a small quantity will affect the momentum of the circulation. Dr. Mills* recommends the drawing of blood by leeches immediately after venesection, as decidedly more efficacions than venesection alone; or the local abstraction of blood by leeches alone, which has been so strongly recommended in continental Europe, and almost generally adopted there.

In the use of so important a measure as blood-letting, reference ought in all cases to be had to the constitutional vigor of the patient, and, whether performed by venesection or leeches, should never be persevered in until exhaustion is produced. There will be but little hazard of serious effects resulting from blood-letting, if it be performed promptly upon the first appearance of sanguineous turgescence, before the general circulation has largely participated in the disordered action, and before the heat from over-excitement has become predisposed to yield to a serious collapse from the loss of blood; nothing, therefore, can compensate for the loss of the first few hours where this remedy is withheld.

The next means for the fulfilment of this indication is the use of purgative remedies, and which, from their powerful influence on the whole secretory apparatus of the alimentary organs, strongly tend, at the same time, to fulfil the second indication, and are almost indispensable measures whenever the circulation requires to be controlled. Whenever the usual evidences of inflammatory irritation in the mucous membrane of the bowels are absent, as is the case in the disease in its purely idiopathic form, an active cathartic may be given without hazard, and to insure its good effect it ought to operate promptly. For this purpose, a solution of some neutral salt or infusion of senna, or calomel, combined with jalap or rhubarb, will be found the most suitable purgative. Whatever be the precise article selected, or the particular mode of its administration, it will, if active in its operation, exercise a powerful effect in addition to bleeding, in arresting the development of inflammation in the meninges of the brain at the early period of the disease.

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* Trans. of the King and Queen's College of Physicians, in Ireland; vol. v., p. 457.

In connexion with these means, which have a direct effect in fulfilling the first two indications of cure, antimonials have also been used with much success by Laennec, in France, and Dr. Stoker, of Dublin. The former gave tartar emetic, and the latter, James's powder, to control the activity of the circulation, and thereby lessen the proportionate action in the brain.

The application of cold directly to the scalp, is a very useful means of arresting the excessive action of the blood-vessels in the brain. It has been supposed by some, that the effect of this agent would rather be the reverse of controlling the activity of the blood-vessels within the cranium, by constricting the capillaries, and thus increasing the inflammation from the crowding of the larger vessels, and those not immediately under the influence of this therapeutic agent. But experience proves these objections to be without foundation, and that it is one of our most powerful measures for the treatment of the disease, as it lessens the action of all the blood-vessels in these parts, by its action on the carotids, from continuous sympathy.

In addition to these measures, that of revulsion on the lower extremities ought by no means to be neglected. A stimulating pediluvium is one of the best; but the use of this and other revulsive remedies will be considered more at large when we come to the subject which is of more frequent occurrence in children, that of the ordinary form of hydrocephalus, arising from a deranged state of the digestive and chylopoetic viscera; the inflammation occurring in the meninges under these circumstances, and preceding the effusion of serum, requiring nearly the same treatment as an idiopathic inflammation of the part.

It is of the greatest practical importance that the origin of ordinary cerebral affections in children should be constantly kept in view, that the disease in its incipient stage may be promptly met by appropriate measures; for upon this very materially depends the success of the treatment. If inflammation has commenced, it is indeed difficult, and in too many instances impossible, to control its course, and to prevent its running into the stage of effusion. The strong tendency, therefore, to cerebral disorders, when there exists a continued derangement of the digestive viscera, ought to be the subject of the physician's fears, that by timely remedies, of a nature which experience has proved to be of undoubted efficacy, the fatal progress of the disease may be prevented. In this disease, more than in any other, the anticipating method must take the place of that baneful mode of practice known as the expectant method.

The early, or forming symptoms of the disease, are often entirely overlooked and neglected; and it is not until the languor, and general paleness of the whole surface, together with the evidences of gastric and intestinal derangement have, after a continuance of some time at least, ended in heat and turgescence of the head, that the disease is for the first time suspected, and much valuable time is lost by the delay. It is to attack the disease at this period, on which Dr. Yeats so much insists, and on which the safety of the patients often rests. He judiciously remarks, that if we proceed upon the principle that the disease is only in the head, we shall be constantly exposed to disappointment, and to unavailing regret for the commission of errors.

Regarding the disease, therefore, in its ordinary form, as consisting of three stages, the indications are, in the first stage, or period of abdominal irritation, to restore the healthy action to the chylopoetic viscera; in the second, to allay the violence of the inflammatory action, to control the febrile condition of the system, and to divert the current of fluids from the brain. In the third stage, that of effusion, our efforts may be almost regarded as hopeless; yet as recovery has sometimes taken place under the most unpromising circumstances, we may still attempt the removal of fluid by establishing discharges from the capillaries by blisters, or by the vicarious evacuation of urine.

We are indebted to the enlarged views of Dr. Cheyne for the first clearly suggested opinion that our treatment must, in the forming stage of hydrocephalus, be directed to the abdominal viscera, and especially the liver; the deranged secretions of which, manifested in the morbid appearances of the stools, give a certain indication that here is to be found the true origin of the disease. In many cases there is a tenderness in the right hypochondrium; this, together with the dark, green, and unhealthy appearance of the bile, demands the use of mercurial cathartics for the purpose of eliciting a free discharge of the biliary secretion. The fœtid condition of the breath, and the yellow, or dark appearance of the tongue, more particularly indicate the cases in which calomel may be freely used. If, however, there should be much soreness manifested on pressing on the region of the liver, leeches should be applied, or if there be much general excitement, blood should be taken from the arm. Calomel has been found, by all practical men, remarkably efficacious in the treatment of hydrocephalus, and it is, doubtless, from its influence over the secretory function of the liver, that its good effects are derived. It should, therefore, form the basis of the cathartic plan, which for the most part is indicated in the treatment of this disease, whether or not it be deemed necessary to associate blood-letting in the treatment of this stage. Gòlis directed a quarter of a grain to a child from one to four months; from one to two grains to a child of six months to a year. Clarke gave one grain every six, four, or three hours, unless a diarrhœa should ensue. The administration, however, of repeated doses of medicine, especially of a cathartic nature, ought, if possible, to be avoided in young children, as its tendency is to keep up an irritative action in the mucous surface of the intestines, which children can not well bear even for a short time. On this account it ought to be given in a full dose, and followed in a few hours by a small quantity of castor oil, or neutral salts. As to the dose of calomel, it does not so much depend on the age in a disease of so great danger as acute hydrocephalus, as upon the urgency of the symptoms, and the effect on the intestinal canal. Five to ten grains to a child from four to eight years of age, and from two to four grains for one between one and four years, will produce a full purging effect.

In the use of cathartics, the appearance of the tongue and nature of the breath ought carefully to be examined; and if the former be found free from fur, clean, or red, and the latter destitute of odor, we ought to avoid the use of any medicine of a purgative nature, which would aggravate the irritation, or perhaps the inflammation of the gastric mucous membrane. When the tongue is red, and there is a tenderness about the epigastrium, cathartics must be avoided, and leeches applied over the affected part. In every instance where there exist much febrile excitement and tenderness of the hypochondrium, this excitement must first be allayed by the application of leeches to the part, or by venesection, before any advantage can be expected from the use of calomel.

It occasionally occurs that the deficiency of constitutional vigor of the child forbids the use of blood-letting, and it may be necessary to substitute other measures to allay the increased action of the vascular system; for this purpose James's powder, or antimony in some form, has been recommended by different practitioners. Dr. Cheyne used antimony in combination with calomel, in cases of infantile remittent, which is very liable to terminate in hydrocephalus. In cases which forbid the use of blood-letting, it would not be unattended with hazard to young children, especially in infants, to make use of antimony; and in place of it, ipecacuanha may be substituted in combination with calomel: a small quantity of ipecacuanha given with a few grains of calomel, and repeated every three or four hours, until a free evacuation from the bowels ensues, would fulfil the most prominent indication at this period of the disease. This method ought, according to the judicious views of Dr. Cheyne, be persevered in until an alteration is visible in the stools. Where these measures fail in producing an alteration in the secretions, Dr. Cheyne, Percival, and Brooks, all advise the use of opiates in some form; they appear to be more applicable where the abdominal disease is connected with irritation in the intestines, and known more especially by the presence of abdominal pain relieved by pressure. It is not safe to give children, and especially those quite young, repeated doses of any simple opiate. Dover's powder, therefore, especially when combined with calomel, will be found eminently beneficial, both in allaying the irritation, and determining the flow of fluids to the surface. The allaying of the morbid irritability of the nerves in children by opiates, is often of signal benefit when judiciously resorted to; and decidedly the best form for its administration is the compound powder of ipecacuanha above mentioned. By the use, therefore, of cathartics and alteratives, with the occasional administration of a mild opiate, we may often allay the irregular excitement arising from abdominal derangement, which so frequently leads to inflammation in the brain, terminating in effusion; and a seasonable interference of art may entirely arrest this formidable disease in its commencement, at a period when there appears but little if any danger.

In the next stage the symptoms assume a formidable and well-known appearance, and demand the abstraction of blood both generally and locally. Our distinguished countryman, Dr. Rush, was early led to regard the origin of the disease as an inflammatory affection, and relied principally on copious venesection for its cure; he has recorded several cases of the success of this practice.* Blood-letting must therefore be our principal reliance, where turgescence, inflammation, and pain in the head, constitute the most marked symptoms of the disease. Drs. Mills, Eberle, and other practical writers, bear testimony to the great efficacy of blood-letting, to be repeated upon the appearance of any return of inflammatory action. The remarks already made on the extent to which bleeding is to be carried, are applicable to every form of inflammation of the brain, for the preternatural activity of the blood-vessels must be arrested, if we wish to prevent a fatal effusion; and the principal difference in the treatment of idiopathic affections of the brain, and those arising from a disordered state of the chylopoetic viscera, is in the order with which the remedies are used; commencing in the latter with such as will directly affect the secretions of the viscera connected with digestion, and in the use of such as are known to exercise a more special influence upon the hepatic system. The abstraction of blood, also, from the right hypochondrium, will also be found at times a necessary preliminary measure in the treatment of the ordinary form of hydrocephalus. When, however, the disease has seated itself on the brain, and the symptoms of inflammation have made their appearance, there can be no difference in the treatment of the affection; for in both, bleeding must be our main dependance. Cold, also, must be applied to the scalp, by means of cloths wetted with iced water. When cold is employed, its effects should be carefully watched, for it may otherwise be carried to a dangerous excess.

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* Med. Enq. and Observ., vol. ii., p. 53.

On the subject of revulsive remedies, there exists but one opinion as to their efficacy; but a difference on the subject of those of an epispastic nature. They should never be used until after the activity of the circulation has been subdued by proper evacuations, and even then the extreme irritation they produce in children makes them a dangerous means. Stimulating baths to the lower extremities may be used with decided benefit in connexion with other measures. It is upon a steady perseverance in these remedies, and a judicious application of them to the existing symptoms, that the disease is to be overcome; for if the next stage, the treatment of which we are now to consider, succeeds, but little hope can exist for the patient.

In the last stage the indication is to remove, if possible, the serous effusion. This may be attempted if there still appears to be much vascular excitement, by the continuance of local depletion, and by the use of mercurial cathartics, where there are symptoms of derangement in the abdominal viscera. The next method of effecting this is by the application of blisters, which, however, should never be used where much vascular action is present. When they are used they ought to be applied behind the ears or upon the back of the neck, and a free discharge maintained by means of stimulating applications. Great benefit has also been derived from dressing the blistered surfaces with strong mercurial ointment.

Hydragogue cathartics have also been resorted to with success under the most unpromising circumstances; a recovery has taken place when the symptoms of effusion had appeared, after giving half a drop of croton oil, given every two hours. In another instance, a spontaneous discharge of urine occurred in a child aged about six months, where all hopes of recovery had been abandoned; immediate relief of all the symptoms of cerebral oppression took place, and the child ultimately recovered. A perseverance, therefore, in the employment of those remedies which will excite a copious flow of the urinary or intestinal secretions, would appear to be the duty of the physician, even when the case appears to be hopeless.

The sudden effusion, to which Dr. Gòlis has given the significant name of water-stroke, I believe is always fatal; whether it is preceded by the slight evidences of cerebral excitement, manifested simply by exhilaration of spirits, which is its only premonition, or whether it arises as a complication of some cutaneous eruption, as measles, scarlet fever, etc. In both, the most close observations are unable to detect the inflammatory affection of the brain, on the treatment of which success almost altogether depends. The course to be adopted should be that used for the removal of the effused fluids mentioned above.

CHRONIC HYDROCEPHALUS.

Etiology.—This form of the disease appears to be connected with some irregularity in the progress of the formation of the brain; for it is frequently of congenital origin, or shows itself for the first time at a very early period of infant life. It is difficult, such is the insidious manner of its approach, to tell when the disease commences, unconnected as it is with the usual causes of hydrocephalic affections, or with any evident inflammation in the meninges.

M. Billard* is of opinion that those cases which are congenital, in all probability arise from an inflammation of the meninges during intra-uterine life, or of some malformation difficult to ascertain, resembling in some respects the nutritive hypertrophy of the brain. The latter idea receives some support from the development of the brain and cranium in the fœtus affected with hydrocephalus. The bones acquire a breadth and thickness, evidently showing an increase of nutrition; and it has also been observed that those infants in whom the brain and cranium are very much developed, are very much exposed to hydrocephalus. The vital activity therefore, or the power of nutrition, ought to be regarded as one of the causes of the form of disease now under consideration. The activity in the nutritive process must almost of necessity increase the secretion from the membranes of the encephalon, and fill the ventricles, and even the surface of the organ beneath the cranium with serous fluids.

Semeiology.—Chronic hydrocephalus is very insidious in its approach, and passes through its different stages in a very slow and gradual manner. When it appears to have made its invasion after the birth of the child, it shows itself by fits of languor and drowsiness, with but little, and often no febrile excitement whatever. Although usually attacking young children, it may occasionally affect those of more advanced age in a very insidious degree, and terminate in the enlargement of the head, which is known as the form called chronic. In the majority of those instances, however, which make their invasion after the period of infancy, there exist more or less symptoms of the inflammatory stage, such as hot skin and headache; and it can not, although gradual in its approach, and perhaps protracted and permanent in its effects, be regarded as the chronic form of the disease.

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* Op. Cit., p. 467.

As the effusion increases, the head enlarges sometimes to an enormous size, while the sutures separate, and the scalp covering the fontanelles is projecting and fluctuating with fluid when pressure is made on the head. At an indefinite period from the first appearances of effusion, symptoms of oppression on the brain make their appearance. These first show themselves in the eyes; strabismus, and dilatation of the pupils successively occur; the intellectual faculties become much impaired, and in proportion as the disease advances are entirely blunted. The locomotive power is gradually lost, the limbs at length become paralytic, or convulsed. The loss of nervous energy is evident in other parts of the system, for the bladder refuses to perform its functions unassisted, and the catheter is sometimes required to draw off the retained urine. All these symptoms may extend to a number of years, and the patient live to an advanced age in a state of idiotism. There are, however, cases on record where the intellectual faculties have remained but little impaired, notwithstanding an excessive accumulation of fluid and a corresponding enlargement of the head. A case of this kind is mentioned by Dr. Monro;* it was that of a child who was brought to St. George's Hospital, at the age of eighteen months, with a head very much enlarged. The size of the head steadily increased, until at the age of eight years it measured two feet four inches in circumference, and the forehead alone was half the entire length of the face. The head was exceedingly heavy, so that the child could scarcely preserve her balance in walking. Her memory was strong and retentive, and she was as lively as children usually are at her age. Michælis,† also, mentions the case of a patient of the age of twenty-nine years, whose intellectual faculties were not in the least impaired, and who had been affected with the disease from his birth.

Very often all the symptoms of chronic effusion appear at the time of birth, and the head has at times been so greatly enlarged as materially to interfere with parturition, and as much as four pounds of fluid have been evacuated from the head of a fœtus after birth. Children born with this accumulation of water within the cranium, will usually live but a few months: the head acquires a large size, the sutures are widely separated, and with other symptoms of oppression of the brain the child becomes paralytic, or dies convulsed. There are several cases on record in which an enormous quantity of water has been found after death, or which has been evacuated by the operation of tapping. Dr. Ireland, in the fourth volume of the Medical Repository, gives an account of a boy aged five years, from whose brain fifty-six ounces of water were removed after death. In the same volume there is also detailed by Dr. Baxter, the case of a child in Philadelphia, who died at the age of eighteen months, whose head measured in circumference twenty-seven inches and a half, and in whose brain was found serum to the amount of nine pints, or one hundred ounces. Another case is given in the same journal, in which an attempt was made to cure the disease by removing the water, and during the space of three months, nine pints and three quarters were removed at different times, from a child seven months old.

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* Med. Trans., vol. ii., p. 359.

† Medical Communications, vol. i., art. xxv.

PATHOLOGY.—Chronic hydrocephalus consists in a great abundance of serum infused in the ventricles of the brain and arachnoid cavity. It is this which has made the distinction between hydrocephalus internus and hydrocephalus externus, although the latter has indeed been applied to the accumulation of water between the integuments and the bone; but this is clearly nothing more than dropsy of the cellular membrane, and not hydrocephalus; but in some cases the fluid has accumulated within the cranium, and through some channel has passed into the cellular membrane, and distended the integuments. The quantity of fluid is sometimes very great; fifteen and even twenty-five pints of serum have been evacuated after death, where the disease has gone on steadily increasing.*

In some instances there has been found an external tumor, where the bones of the cranium have been widely separated in hydrocephalus, through which the brain has protruded, forming a real hernia cerebri. This is clearly the result of the compression which the brain undergoes from the effusion of the serous fluid. The hernia may be satisfactorily ascertained by noting the situation of the tumor, as it always occupies a part corresponding to one of the fontanelles.† A remarkable case of this nature is recorded in the fourth volume of the American Journal of the Medical Sciences, by Dr. Horner, where the fluid had forced out the posterior lobes of the cerebrum through the posterior fontanelle.

As was before remarked, chronic hydrocephalus, which appears very early in life, is connected with some degree of malformation of the brain; and dissection reveals in such cases the existence of some imperfection, or defect in the organization, which is a remote cause of the disease. The brain, also, has been found in a spongy and fungous state,‡ and sometimes disorganized so completely, as to present the appearance which has been of late described under the name of ramollissement, affecting at times both parts of the brain. The brain has been found partially absorbed, the part which it occupied being nothing more than a sort of pouch; from the absorption of a portion of the brain, the effused fluid finds its way from the ventricles to the dura mater, in contact with the upper part of the cranium.*

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* Bonnet, Sepulcho., Lib. i., sec. xvi.

† Billard, Op. Cit., p. 471.

‡ Conrad, Diss. de Hydroceph., Argent, 1778.

In general, the whole head increases in size. In some cases, however, there has been found an elastic tumor formed by the yielding of the dura mater, which gradually increases in size, until it becomes equal to the head.

The bones of the cranium have in many cases become very thin, and being deprived of the calcareous part, have appeared to consist of scarcely anything more than cartilage.

There can exist no doubt that effusion of fluids may occur from a relaxed condition of the secernents, as well as from the excited action of those vessels; but in the disease before us it appears to be evidently connected with the active state of the secernent vessels, dependant on the growth of the brain, and perhaps connected with a torpor of the absorbents. The frequent connexion of the disease under consideration with a malformed state of the brain—a state of nutritive hypertrophy—sufficiently proves these views. When this form of disease, however, comes under our notice, it can scarcely be regarded as one of activity; we see it only in its consequences, and may compare it to the third stage of acute hydrocephalus; but from its identity with the development of the brain, the accommodating powers of nature have enabled the parts to yield to this diseased state of things, and afford one of those numerous instances of the resistance of the system to dissolution at the early period of life.

TREATMENT.—The treatment must be directed to the removal of the effused fluid, either by endeavoring to promote absorption, or by evacuating it. Diuretics have been used, and Dr. Withering recommends particularly digitalis, a medicine which can not be employed with safety in young children, from its depressing power on the circulation. Active purging can not be advantageously used in this disease, and at the early period of life at which it usually makes its appearance. Calomel, as a tonic and alterative has been used, it is said, with advantage; but of this I can not speak from any experience. Blisters and issues have in some instances been followed by good effects—rarely, however, when the disease is deep-seated and extensive. A permanent drain established on the vertex is recommended by Dr. Mills.

The first who operated on the head for the purpose of curing chronic hydrocephalus, by drawing off the water, was Dr. Vose, formerly of New York. This was in the year 1806. The cure has been effected by Dr. Conquest by tapping the head; in some instances, under the most unpromising and deplorable circumstances, where there was a total loss of sight, convulsions, etc. Of nineteen cases operated on by him, ten were cured: the quantity of fluid discharged varied from six to forty-eight ounces. Dr. Charles A. Lee has given the results of this operation, where the child was so far restored as to perform the ordinary movements of the head, and suck freely on the twelfth day. For eight days was it doing well, when symptoms of accumulation appeared, and the operation was again performed. The child died on the twentieth day after the second operation, of cholera infantum.*

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* Baillie, Morb. Anat. Fasic. x., p. 213.

There is a case recorded by Dr. Höfling,† of a boy, aged five years, cured of chronic hydrocephalus by accidental paracentesis. He received a kick from a cow which fractured the frontal bone, already extremely thin; a quantity of serum flowed from the wound for eight days. Two years after this accident the boy enjoyed good health, and the head bore but a proper proportion to the size of the body.

From the belief that chronic hydrocephalus might at times result from a want of due resistance in the bony parietes of the head, compression has been resorted to by means of bandages and adhesive straps; the former method was used by Sir Gilbert Blane, and the latter by Mr. Barnard. Recently this method of treating the disease has been successfully practised by Dr. Engleman, a German physician. In all the cases in which it was used, ten in number, the method was followed by the absorption of the fluid and recovery of the patient. His method consists of the application of bandages and adhesive straps, which are to be renewed as the head diminishes in volume. The cases are detailed in the Archives de Médicine, for June, 1838.

HYDRENCEPHALOID DISEASE.

There is a remarkable affection of the brain which demands an especial attention, on the part of the practitioner, from its close resemblance to hydrocephalus arising from an over-excited action of the vessels of the brain, but which has its origin in an entire different condition of that organ. We have seen that certain symptoms such as stupor, coma, and similar affections of the cerebral organ, are traceable to an increase of blood in the part affected, and a subsequent effusion of fluid as a direct consequence of such over-excitement. We have now to consider much the same manifestation of disease, but arising from an opposite condition. In the former there were pain, throbbing, heat, wakefulness in the commencement, and sleep and stupor at the termination of the malady; in that now under consideration there are much the same excitement and exhaustion; but a deficiency of blood throughout the system, and a state of general exhaustion and languor, with paleness of the surface, show a condition materially differing from the former.

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* N. Y. Med. and Phys. Journal, vol. vi., p. 490.

† Wochenscrift für die gesammt Heilkunde, No. 41.

This peculiar form of cerebral disease was first noticed by Abercrombie, and afterward by Gooch and Hall.

Etiology.—Spurious hydrocephalus appears to be connected with a deficiency of blood in the general system, and although excitement may cause an increase of circulation in the organ which is the seat of the disease in question, yet from the impoverished quality of the blood, it fails to stimulate it to inflammatory action. It is, therefore, mostly found to prevail among those who are delicate and small, or those who have been reduced by excessive evacuations from the bowels, produced by improper feeding, weaning, dentition, etc. The injudicious use of purgatives, or excessive and unnecessary bleeding, will not unfrequently be followed by symptoms closely resembling active meningitis, a state really arising from a condition of a totally opposite nature. Convulsions, blindness, and coma, will quickly follow the loss of blood, which has at first produced a quickened pulse, with throbbing of the temples and exalted sensibility. This train of symptoms has been seen in animals that have been bled to death. Exhaustion from want of food has also been succeeded by similar symptoms.

Pathology.—This is easily understood from the account just given of the causes of this affection. Autopsical examinations show occasionally serous effusion in the cerebral cavities, sometimes accompanied by venous congestion: the latter may exist without any effusion.

Semeiology.—Children thus affected have a frequent pulse, heated skin, an excessive sensitiveness and irritability, crying and exhibiting great fretfulness on the most trifling occasions: a slight touch on the skin will produce a starting if asleep and a fretful impatience when awake. There is much sighing with moaning when asleep. These symptoms are not uniformly present,—they are but the premonitions, the manifestations of a state of system which is unfavorable to evacuations of any kind. When the hydrencephaloid condition is actually present, the child lies quietly as if partially asleep, occasionally opening and closing the eyes. No interest is manifested by the patient in any surrounding objects, not even for a light, even if it be brought near to the pupils. There is a paleness of the entire surface, and a coldness of the cheeks. The respiration becomes slow and feeble, with the sound of mucus in the trachea, and at times a dry husky cough. These symptoms increase until there is a perfect coma.

TREATMENT.—When these symptoms arise from hemorrhage, stimulants ought to be promptly given, such as wine whey, arrowroot and wine or brandy, and five or ten drops of aqua ammoniæ in an ounce or two of water, of which the child may take as much as it can conveniently swallow. If an infant, it ought to be fed with the breast milk with a spoon, if unable to suck. Common chalk mixture, with the addition of a few drops of the camphorated tincture of opium, may be given, if diarrhœa be present, and has produced these symptoms of exhaustion. Warm flannels, and frictions gently applied, should also be used, and the patient exposed to an elevated temperature, while the skin continues cool. A recumbent posture must be continued; a disregard to this might be suddenly fatal. A blister to the neck, and similar external irritants to the other parts of the body will be found highly useful in restoring action to the system. A good diet during convalescence is of the greatest importance in this affection.

DISEASES AFFECTING THE APPENDAGES OF THE NERVOUS SYSTEM.

The ordinary affections of the organs of intellectual sensation, comprising those of sight and hearing, will necessarily form part of the diseases of the present system; those connected with the corporeal or nutritive senses having already been considered. Such diseases of these organs only as are peculiar to children, will be the subjects of the present remarks: for those that are common to all ages, the reader is referred to works *ex professo* on these subjects.

OPHTHALMIA.

ETIOLOGY.—This would appear at times a real congenital affection, for infants are seen born with the marks of inflammation that had evidently existed in the fœtal state. For the most part, it appears within a week after birth, and arises either from the contact of the part with a vitiated secretion from the vagina of the mother, or from the stimulating influence of cold or too great heat, or from the effects of light or smoke.

It is a very common occurrence to find it following leucorrhœa; indeed, when a woman has been thus disordered during gestation, the child will almost certainly be affected with some degree of ophthalmia. So, also, gonorrhœa will be invariably followed by this affection in the infant.

At other times it appears to arise from the stimulating effects of light, smoke, or other external causes, acting directly on the eyes. When it is produced by these agents, it is later in its invasion than when it occurs from causes connected with parturition; scarcely, however, appearing after the fifth day. Neglect of cleanliness in not carefully washing the child, may become a cause of this affection, especially when any redness appears in them from an atmosphere filled with smoke. Badly-ventilated apartments, it is well known, will cause a development of ophthalmia, and is one of the chief causes of its prevalence in foundling hospitals.

SEMEIOLOGY.—The disease sometimes appears immediately on the birth of the child, but in most instances does not show itself until the second or third day after birth, rarely after the fifth. It appears in two stages, the first of inflammation, the second of suppuration.

The first appearance it exhibits is a slight inflammation, attended with a considerable degree of tumefaction, with a slight oozing from the eyelids, which causes them to adhere on its becoming slightly hardened. At this period, when the palpebræ are opened, a drop of white fluid escapes, and the inner surface is of a deep red. This is attended with a great aversion to light, the child keeping the eyelids closely shut in a lighted apartment, but opening them on the light being removed. When the inflammation is severe, it is evidently attended with pain, as indicated by the crying; and the intolerance of light is so great, that it is difficult to obtain a sight of the eyeball.

After a short but indeterminate period the purulent stage commences, which is known by the increased swelling of the eyelids, and a discharge of pus taking place from between them. When they are separated a great discharge ensues, and if the conjunctiva can be seen, it appears to be excessively inflamed. A great sensibility still continues in the affected part, and the patient keeps the head continually turned from the light. The drying of the pus causes the eyelids to adhere, when the accumulation beneath them is often very great, and the tumefaction is excessive. At other times small granulations are formed on the conjunctiva, and the swelling of the folds of this membrane forces the tarsi outward, and produces a complete inversion of the eyelids. The purulent discharge is thick, and usually of a yellow color, sometimes mixed with blood. This discharge may be of a greenish hue in children of an unhealthy constitution. After continuing about a week, the symptoms in favorable cases, and in such as have been met by suitable treatment, gradually subside. If the inflammation should continue longer, a purulent infiltration of the cornea takes place, and ulceration of this part occurs, usually in a circumscribed spot, but, in very severe cases, throughout its whole extent. When the eye is examined after a spot of ulceration has proceeded until it has penetrated the cornea, the iris will be seen protruding. In still more severe cases, where the cornea is ulcerated to a considerable extent, the whole of the humors of the eye will be found to have escaped.

Opacity of the cornea is, however, the most common result, existing either in a small, circumscribed spot, or covering the whole extent. This condition may be in every degree, from a slight hazy appearance to a perfect thickening, entirely destroying its transparency. Sometimes adhesions of the iris to the cornea take place; at other times there is an opaque spot, of the size of a pin-head, in the outer hemisphere of the capsule of the lens. In general, although the symptoms may be very severe, and the distention from the quantity of pus very great, the termination of infantile ophthalmia is favorable; but cases of extensive sloughing or opacity of the cornea have occurred, where the affection has been much neglected, as is sometimes the case among the poor.

Treatment.—The first stage of ophthalmia should be treated on strictly antiphlogistic principles; by which, however, it is not meant that in every instance the abstraction of blood is needed; this being only necessary in severe cases of inflammation. It will be often sufficient to keep the eyes well washed with tepid milk and water, or the mucilage of linseed or slippery elm; the latter, especially, has a remarkably soothing effect on the inflammation of these tender parts. This course, when adopted immediately on the appearance of inflammation, with an open state of the bowels, and great care being taken to keep the child from the light and smoke, will in many instances readily remove the disease.

When, however, there is a redness of the eye itself, or if this can not be seen, but the lids are swollen and red, blood must be taken from the part by means of a leech, or the conjunctiva may be scarified. If the former method be adopted, one leech will suffice, for, from the great vascular turgescence of the part, the blood will flow with great readiness.

The subjoined formula may then be advantageously used, as an application to the inflamed eyes; but all astringents and stimulants should in this stage be avoided.* An aqueous solution of opium may be employed with very good effects where there exist much pain and intolerance of light. A solution of some of the salts of morphine, in the mucilages already mentioned, I have also used un-

* ℞ Plumbi. Acetat., gr. iv.
Aquæ Destill., ℥iv.
Mucilag. G. Acaciæ, ℥ss. M.

der these circumstances with benefit. At the same time more active effects should be produced on the bowels than above mentioned, by means of a small dose of calomel, to which may be added a quarter of a grain of ipecacuanha, if much febrile excitement be present. This course, followed by a small portion of castor oil from time to time, will keep the bowels free. A small blister ought also to be applied to the temples, or behind the ears.

In the second, or purulent stage, astringent or stimulating collyria will be needed; great care, should, however, be observed, in not resorting to remedies of this nature at too early a period of the disease: the proper time for their use will be known by the disappearance of the excessive redness. A solution of the sulphate of zinc, in the proportion of a grain to an ounce of water, or two grains of alum to an ounce, may be used, and will in general effect a cure. A solution of the bi-chloride of mercury, one grain to an ounce of water, forms a good collyrium, where a stimulant is needed; or a solution of alum, from four to ten grains in an ounce of solution. In obstinate cases, the nitrate of silver will be found useful, in the proportion of two grains to the ounce, gradually increased to six grains. Any of these solutions may be injected between the eyelids three or four times in the course of twenty-four hours. Where there is great prostration with a destruction and sloughing of the eye, tonics are indicated, and among these, quinine is one of the best.

OTITIS.

Inflammation of the ear occurs frequently in children, from the great sensibility of the part, and for the same reason is a very painful affection. It is either acute or chronic.

ETIOLOGY.—The predisposing causes are plethora, a scrofulous habit, excitement of dentition, etc. The most common exciting cause of the acute form is cold, and especially the washing of the head and neck with cold water, and the exposure of these parts to a stream of cold air. Children not unfrequently have an attack of ear-ache after having the hair cut, and being exposed to the causes already mentioned, especially while in a state of perspiration. Any foreign body introduced into the ear-passages will also produce an inflammation of these parts. It is also produced by other diseases, as inflammations about the throat; and consequently it often follows an attack of scarlet fever, malignant sore throat, and ordinary tonsillar inflammation. A chronic inflammation is most frequently the result of these last-mentioned causes, and known by the name of otorrhœa, from the discharge which takes place from these parts.

SEMEIOLOGY.—It is known by the pain in the ear, which is very severe and distressing, both from the great sensibility of the part, as from the tense and unyielding nature of the membrane forming the tympanum. This for the most part is confined to the ear itself, but not always; as the side of the head, and even the brain, have become involved in the inflammation. When this occurs there is a great increase of the circulation, with heat, fever, thirst, delirium, and stupor. The inflammation will sometimes terminate in suppuration, and the discharge gradually changes its character to thin, offensive sanies, from the deep-seated ulcers formed in the ear. The chronic form of otitis, when there is a continual discharge from the part is frequently a termination of the acute disease. It is a very common affection after scarlet fever, and is characterized by a discharge, which varies in quantity and color, but is for the most part uniformly of an offensive odor. When it is continued for a long time, the inflammation and disorganization extend through the tympanum, and the small bones of the ear are discharged. Deafness, for the most part, is a prominent symptom throughout this affection, increasing in proportion to the extent of the disease.

TREATMENT.—For the ordinary form of otitis or otalgia, by which name it has been called from the violence of the pain, such remedies only are required as will remove the local irritation, and restore a secretion to the inflamed surface, such as the application of warmth and moisture to the part, by means of a poultice of hops; the latter, especially, will have a very soothing effect, and if accompanied by purgatives and warm pediluvium, will often arrest it at once. An ordinary poultice, with laudanum, will also be a useful remedy; and when the pain is very severe, a few drops of laudanum and sweet oil on a small piece of cotton will afford great relief. A small lump of camphor enclosed in a piece of cotton will often relieve a severe attack of ear-ache. The wax in the ear at times becomes hardened, and should be softened and removed. This may be done by means of warm water injected into the external passage by means of a syringe with a large orifice whereby the part may be thoroughly washed. If these measures are not followed by an abatement of the symptoms, either local or general bleeding will be necessary; this should be followed by a continuance of the soothing local applications above mentioned. The necessity of a strictly antiphlogistic course may be known by the increase of heat, pain, and some degree of tumefaction, which may be discovered on inspection. Leeching, general bleeding, with purgatives and antimonials, will in some cases be demanded, according to the extent and violence of the inflammation.

If suppuration occur, and the inflammatory symptoms have subsided, stimulating and astringent injections will be indicated, as the sulphate of zinc, in the proportion of two or three grains to an ounce of water. The chloride of soda, also, will be highly useful, especially when the discharge from the ear is offensive. In the chronic discharge from the ear, a general tonic course is required, while the part is kept well cleansed by injections of soap and water, and gently stimulated with the injections above mentioned. A permanent issue, also, will greatly assist in disposing the part to heal; it should be placed on the back of the neck or on the arm. The cure of chronic otitis is a subject of acknowledged difficulty, and is in proportion to the extent of the injury and the length of time it has continued. It is of great importance to ascertain the state of the general health of the patient, and to adopt a course of treatment for the restoration of this. If a scrofulous habit prevail, a full course of iodine will be needed, combined with mercury or iron, according to the indication in each particular case. At other times a tonic course, simply, will be all that is required.

The applications at first should consist of tepid water injected by means of an ear syringe; this course ought to be persevered in for a a long time. After which injections of a weak solution of the sulphate of zinc, acetate of lead, or nitrate of silver, may be used, which may be gradually increased in strength according to the requirements of the disease; bearing in mind that the discharge must by no means be suddenly arrested especially in young children. Should this occur it might be followed by a severe cerebral affection. On any sudden disappearance of the usual discharge, warm fomentations or a soft poultice ought to be applied without delay and continued until the evacuation is restored, while the astringent injections are withheld. When the discharge has become much lessened in a gradual manner, it would be well still to guard against any serious effects of its entire stoppage, by applying a blister behind the ear, and to keep up a permanent drain from the blistered surface.

MOTOR SYSTEM.

PECULIARITIES OF THE MOTOR SYSTEM.

The bones connected with the limbs are, like the rest of the skeleton, in a very imperfect state of ossification at the period of birth; the chemical constitution also differs at this period, and during childhood, from the bones of an adult.

The different processes of the scapula are not perfectly united to the body of the bone until about the fourteenth year. The clavicle is one of the first bones formed, and during the fœtal state is comparatively of a large size, and is of a full proportionate size in infancy. The humerus at birth is only one nucleus of bone in the small head. The condyles are formed some time after birth, and are perfectly united with the body of the bone a considerable period before the full growth of the child. The same may be remarked with respect to the bones forming the fore-arm, the shafts being comparatively perfect, and the different processes not completely united to the body, until about the age of ten or twelve years.

The bones forming the pelvis are much less developed in an infant, than the scapula and clavicle forming the bones of the upper extremities. All the bones composing the pelvis are separate; and the three portions forming the ilium of a new-born child are not united until the seventh year. The femur observes the same laws in its development as the humerus, but the union of the processes is much later than that of the first-mentioned bone. The tibia and fibula are also rather later in the full disappearance of their cartilaginous portions.

From the difference, therefore, in the development of the upper and lower extremities, we see the cause of the greater ability of the child to use its arms and hands almost from the period of birth. The imperfect formation of the bones of the pelvis and lower limbs prevents the child from using them at all; and the narrowness of the pelvis deprives it of the ability to sit, even if there existed muscular power sufficient to support the body in an erect position.

During these alterations in the bones, the muscles undergo changes in their appearance, as they increase in cohesion and solidity. They are at birth much lighter colored and softer than at other periods of childhood. Gelatin abounds in infancy; as age advances the proportion of fibrine increases. When the growth of the body is complete, their red color is then strongly marked, and their power increases.

As the bones and muscles change with the growth of the body, the child exerts his powers of movement, and all his muscles are in a continued state of activity. This restlessness is a peculiarity of childhood, and appears to be connected with the process of development, as the muscular efforts are rather those of simple action than of power.

Muscular exercise is essential to the proper growth of the body, and therefore the infant and child should be allowed to use such exercise as nature demands. Simple carrying is all that a young infant needs, and will often allay the accumulated excitability arising from the want of exercise. Premature attempts at making the child sit or stand are always injurious, by causing an undue pressure on the viscera of the abdomen and thorax. Active exercise in older chil-

Symtoms

dren should be freely allowed, as nothing tends more to the full action of the nutritive process, and the proper development of the body.

SIGNS OF DISEASE FROM THE MOTOR SYSTEM.

The excessive increase in the length of the bones is a frequent occurrence after exanthematous fevers; and rachitis is not an unusual consequence of this derangement of nutrition. In protracted disease it is a sign of debility, and yields an unfavorable prognosis. When the bones are suddenly developed in youth, without any apparent disease, it has been supposed to indicate a premature development of the sexual instinct.

The bones of the foot are often changed in their form from the powerful action of one set of muscles, producing club-foot; so, also, curvatures of the spine may occur from a preponderance of action in some of the muscles.

Enlargement of the ends of the bones is an evidence of the existence of scrofula and rickets; it is very common also after severe cases of scarlet fever or measles.

The muscles usually diminish in size after the continuance of any febrile disease; but this of itself is not to be regarded as unfavorable. If this wasting continue after the disappearance of fever, or when it attends chronic disease, it is decidedly unfavorable, as it indicates the existence of disorganization. The wasting of the spinal muscles marks the existence of tabes dorsalis.

The sudden increase of muscular activity in a young child, especially if accompanied with great exhilaration of spirits, denotes an increased circulation of the brain, and often precedes sudden attacks of hydrocephalus.

Lassitude and weariness are very common in children before acute diseases, especially those of a contagious nature: muscular debility being always produced by the influence of contagion, and is a good diagnosis of the disease during the prevalence of epidemics. A prognosis may also be made from the extent of debility during the continuance of acute diseases, as it always marks the extent of the disease, and denotes the affection of some important organ.

The sudden loss of muscular power gives a very unfavorable prognosis; and the total want of ability in a child to stand, denotes a serious affection of the brain, and is usually the precursor of the sudden effusion denominated water-stroke. The alternation from great debility to increase of strength in chronic diseases is also an indication of cerebral disease, and is a much more unfavorable sign than the continuance of debility.

Great restlessness, and involuntary movements of the muscles in

Symtoms

long-continued disease, are unfavorable signs, and usually denote cerebral disease.

Convulsions and spasms usually proceed from irritation, inflammation, or other affections of the brain and spinal cord. In other instances they appear to depend solely on the irritation of the ganglionic nerves, from worms or other irritation in the stomach and bowels; when this is the case, there is but little or no cerebral disturbance, and the child, if old enough, will perhaps recollect and describe the occurrences which took place during the paroxysm, although unable at that period to articulate.

Spasms affect either the whole body or a certain set of muscles; and in chorea, the spasmodic action occurs in different muscles in succession. When spasms affect the muscles of the face alone, it is a more unfavorable sign than when any other set of muscles are affected. Spasms in children are much less dangerous than in adults; but when they occur in chronic diseases, they give in all a bad prognosis. When proceeding from gastric irritation, worms, or dentition, they are not in general to be regarded as dangerous. Other affections of the muscles are considered under the signs of disease, from the influence of the nervous system.

DISEASES OF THE MOTOR SYSTEM.

ABSCESS OF THE HIP JOINT.

Abscess of the hip joint, or morbus coxarius, is a disease very insidious in its approach, and often makes rapid progress toward the destruction of the bones forming the joint, and consequently producing irremediable lameness before it is discovered. A close watchfulness, therefore, becomes necessary, that the disease may be detected, and the remedies applied in its incipient stage.

Etiology.—A scrofulous habit of body appears, in some instances, to predispose the joint of the hip to inflame, suppurate, and become carious, for it is difficult to trace the disease to any other source than the spontaneous occurrence of inflammation, which is apt to arise in such conditions of system. It has been supposed at other times to arise from the injuries children receive in their sports.

Semeiology.—The first sign of the existence of the hip disease, is the inability to move both limbs equally: one of them appears to drag while the other is properly moved. A child, also, that has this affection, in its forming stage, will be often seen to fall, as if tripped by the carpet. This arises from the toes of the affected limb being a little inclined downward when the foot is raised; no complaint being made, the existence of disease is not even suspected from this circumstance, but the child is supposed to have met with an ordinary fall, to which it is so liable in its sports.

The affected limb, when compared with the other, is discovered to be a little shorter; and when the presence of disease is evident, its nature is still mistaken, for the child refers his uneasiness to the knee and lower part of the thigh. As it advances, the rotundity of the affected hip disappears, and a more marked shortness of the limb is noticed, while the child evidently limps in walking. By a careful examination, the seat of the disease will easily be discovered, principally by flexing the limb with the hand; the knee, where most pain is felt, being easily moved.

After the affection has continued for some time, suppuration will take place, and the bones of the joint will be involved in the disorganization, and become carious. An abscess forms and discharges an unhealthy pus; great prostration ensues, and the patient dies in great exhaustion.

TREATMENT.—The treatment in the first stage must consist of the usual means of allaying inflammation, while the limb is kept at perfect rest. When there is much heat of the surface and activity of the pulse, the child should be bled from the arm, and the bowels freely opened by active purgatives. These should be repeated if there is a continuance of the pain and fever. The hip, also, ought to be leeched or cupped, if the pain and other evidences of inflammation continue unabated; local sanguineous depletion should always be used when bleeding from the arm is counter-indicated by the debility of the child. A constant open state of the bowels must be preserved by means of daily purgatives, suited to the age and strength of the patient; the pulvis purgans and calomel may form the first purgative mixture, followed by an infusion of senna every day or two in a robust child, until a sensible reduction of the pulse takes place. The child should be kept, if it be possible, constantly lying on a hard mattress, and no opportunity whatever of exercising the limb afforded until an entire cure is effected. Where this can not be accomplished in a young child, the use of a splint adapted to the part may prevent the movements of the limb.

With this course, adopted in the stage of inflammation, a cure will in most cases certainly follow; but where the disease is left until suppuration, or disorganization has occurred, very little can be done to prevent a permanent lameness. In this stage it is often very much protracted, and attended with great suffering, prostration, and emaciation. In the early part of the suppurating stage, if the child retain sufficient strength, a permanent issue should be made near the affected joint, and the usual hygeinic measures of a change of air, or a residence near the sea in hot weather, cold bathing, and a nourishing course of diet adopted, to impart energy and vigor to the constitution, so necessary to enable the child to resist the effects of continued irritation, and the exhaustion from the excessive drain.

CLUB-FOOT.

Distortions of the feet, from the time of Hippocrates until the close of the last century, attracted but little attention from surgeons; and the only method of cure attempted was the application of bandages and other mechanical contrivances, for the gradual adjustment of the distorted and displaced bones. At this period, important improvements were suggested by Lorenz, a surgeon in Frankfort, at the suggestion of Thilenius, a physician of that city.

In the year 1838, Dr. Louis Stromeyer, of Hanover, published an essay on the subject of orthopœdia, with practical observations on the division of contracted muscles and tendons. The next work of note appeared in London, in the year 1839, by Dr. W. J. Little, in which the nature and treatment of club-foot are considered at length. This important subject has received the attention of surgeons in the United States, and additional suggestions have been made by Dr. Thomas D. Mütter, of Philadelphia, and Dr. W. Detmold, of New York.[*] A few practical suggestions occur in the various medical periodicals, but the above comprise the monographs that have been published on the subject.

Etiology and Semeiology.—Congenital club-foot was formerly attributed to a malformation of the astragulus and other tarsal bones, and on this account the replacement was considered a very difficult operation, if, indeed, it could be performed at all. Subsequent observations, however, have shown that it is in most instances referable to the contractions of the muscles, arising from a primary affection of the nervous centre, causing convulsions which the fœtus suffers. These distortions have been found in fœtuses of from three to five months old, where there were deficiencies and malformations in the cerebrum and medulla spinalis; and anencephalus and hemicephalus embryos have exhibited both hands and feet distorted in that manner. The affection has been known to be hereditary, arising from the transmission of the irritability of the nervous system, producing convulsions and spasmodic contraction of the muscles.

It may also arise after birth from a similar cause, producing paralysis of the muscles; when, on a partial recovery, the flexor muscles act more powerfully than the extensors, and thus cause the distortions of those parts more easily affected by the powerful action of the muscles, and which also, from the arrangement of their bones, more easily yield to this unequal action.

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[*] A Lecture on Loxarthus, or Club-foot, by Thomas D. Mütter, M. D.; Philadelphia, 1839. An Essay on Club-foot, etc., by W. Detmold, M. D.; New York, 1840.

Club-foot has been divided into four species by Dr. Little, with the generic appellation of Talipes; these being of practical use, are now generally adopted to describe the various distortions of the foot.

The first, *Talipes varus*, is where the heel is drawn up and the foot turned inward; the toes are also turned inward, and the patient walks on the outer ankle. It is produced by the contraction of the gastrocnemii and the abductors of the foot.

The second species, *Talipes valgus*, is where the foot is turned outward, and where the patient walks on the inner ankle. The gastrocnemii and the abductors of the foot are here contracted.

The third, *Talipes equinus*, where the gastrocnemii muscles are contracted without any affection of the others. In this species the patient walks upon the toes.

The fourth, *Talipes calcaneus*, is caused by the contraction of the muscles in front of the leg; when the patient walks on the heel.

TREATMENT.—The improvement in the treatment of club-foot is one of the greatest triumphs in modern surgery, whether it is regarded as the results of the accurate knowledge of the morbid condition of the part, or the benefits which result from the means used to remedy this deformity.

The indications of cure are to remedy the contractions of the muscles producing the deformity, and to afford an opportunity to those which act in opposition, to recover their power of action. These are accomplished by means of apparatus adapted to the extension of the contracted muscles, the extension to be gradually but steadily increased until the permanent contraction is overcome; or by a resort to the section of the contracted muscle or the tendon connected with it.

The division of the tendo Achillis was first resorted to for the cure of club-foot, in the year 1784, by Lorenz, of Frankfort. With some variations in the details, the same operation was performed by Michaelis and Sartorius; and about the year 1816, by Delpech, in France; but owing to its failure, a number of years elapsed before recourse was again had to the knife. In 1831, Dr. Stromeyer, of Hanover, undertook the operation with complete success. Since this period it has been the usual recourse for the removal of deformities of the limbs, by a number of surgeons in Europe and America. It was first performed in the United States by Dr. James H. Dickson, of North Carolina, in 1835, and by Dr. N. R. Smith, of Baltimore, in 1836, and in the following year by Dr. Detmold, of New York.

It is not within the limits prescribed to this work, to describe at length the operation of tenotomy, which has of late years been so successful in the removal of the deformities of the feet and limbs; the works already mentioned contain a great amount of practical matter on this subject, and are in the hands of every surgeon. However important and successful the division of tendons may have been, it is not to be resorted to on all occasions, and an unnecessary number cut. On this subject Dr. Detmold makes the following judicious remark: "We are far from sanctioning an indiscriminate use of the knife, and if a little more patience and attention on the part of the surgeon will render the division of the muscle unnecessary, we consider it the urgent duty of every surgeon not to yield to a fondness for operating, but be guided solely by the result of a conscientious examination in deciding that the knife is absolutely necessary or at least preferable."

NOTE TO "VACCINATION."

At the request of the author, Dr. Morrell, physician at the Long Island Farms, a department of the New York Alms-House where children are received, kindly furnished him with the statistics of the cases of varioloid which occurred at that establishment from the first of November, 1834, to the first of May, 1843, comprising a period of eight years and a half. From this, it appears that of 5,856 children who were received during that period, there were but eight deaths from varioloid, among those in whom it was ascertained that vaccination had been practised. This result, added to that already stated at page 467, exhibits an aggregate of nearly 16,000 children vaccinated, and but eight deaths among them from the effects of small-pox contagion.

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